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THE DAILY FIVE MINUTES.



THE AUTHOR WITH HIS ELDEST SON AND YOUNGEST GRAND-DAUGHTER.

Frontispiece.

THE DAILY FIVE MINUTES

FOR THE FIT TO KEEP FIT
AND
THE BEST BASIS OF PHYSICAL TRAINING
FOR BOTH SEXES

By
J. P. MULLER, K.D.

Author of "My System", Etc.

*Issued under the patronage of
H.R.H. The Prince of Wales.*

FOURTH REVISED EDITION

WITH 50 ILLUSTRATIONS AND 4 CHARTS.



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THE AUTHOR'S PREFACE

The present is an age of real physical culture, probably the first since the great days of Greece. It is true, during the period of the Renaissance in Italy, we saw some sort of physical culture, but then it was not connected with sound education and rational development of the body, inside as well as outside, nor was it connected with proper personal hygiene. It was merely a sort of "muscle idolatry."

Our period of physical culture started with a similar "idolatry"; on the one hand, the exaggerated development of the visible muscles of the weight-lifters, wrestlers, and gymnasts; on the other, the exaggerated stiffness of carriage in Swedish drill and similar sorts of "calisthenics."

We now know that both these so-styled signs or proofs of health and strength are false, but we have not yet reached the ideals of the ancient Greeks, whose experience was based on 1,200 years' experience. I think, however, I can say that during the first century of our period we have made considerable progress towards the ideal; whereas all the Continental "strongest men in the world" whom I knew, have died long ago—most of them in their forties—we now see intelligent weight-lifters combining their systems of development with scientific hygiene. As for the pouter-pigeon figure, well, I think I have given the *coupe de grace* to that product of Swedish superstition.

MY FIRST BOOK

My first venture in letters, published in 1904 under the title: "My System," and containing my 15-minute tables of exercises, bath and skin-friction—all for health's sake—has been a considerable factor in the great work of getting our physical culture movement on the right track, i.e., one leading towards the antique Greek ideals. When successful, one of the main causes has been

that from the first moment to the last I have constantly held the images of the Greek statues before the eyes of my readers. I put Apoxyomenos on the cover of my first book, and a statuette of him now stands on the mantelpiece at my office, while I have Antinous (who adorns the cover of this my latest book) before me on my desk. Almost daily I make use of them, in that I demonstrate to my visitors that when we look from the side upon these ideal male figures of the strongest all-round athletes who ever set foot upon this planet, we will see the abdomen protrude a little more than the chest, when they stand in a natural and therefore beautiful pose, as they always do.

Since 1904 "My System" has been translated into 24 languages, in many cases together with its companion volumes for ladies and children, and I may safely say it is now a classic in every civilised land—even in Asia and Africa. To busy men who felt they were not as fit as they ought to be, the idea of 15 minutes a day to cure their ordinary small chronic ailments and correct their stooping figures and shortness of breath, made an instantaneous appeal, and now perhaps millions of people all over the world carry out daily this 15 minutes' system, to the great benefit of their health and efficiency.

I have gradually improved my cheap text-books to such a degree that any person without means, but possessing some intelligence and energy, can derive nearly as much benefit from these as from expensive personal or postal courses of tuition, even when the person be weak, old, or ailing.

A NEW CONDENSED "SYSTEM."

As a result of many years of experimental work with the old "My System," and also of many suggestions* and inquiries,

*Amongst others, a military gentleman of high rank said to me: "Before the war I had a full course of instruction in your 15 minutes system and kept it up for some time, but only spasmodically, in France. Now I am demobilized and very busy. Have you some selected exercises which would occupy only five minutes and yet keep me fit? I have absolutely no time for as much as 15 or 20 minutes, either in the morning or at night." I pulled out a drawer and presented him with my Five

I came to the conclusion some years ago that a condensed "system" could be worked up which, while retaining all the good points of the parent system where general health was concerned, would discard certain parts which were not necessary to already fairly healthy persons, and substitute for them a number of exercises combining movements essential to maintain health when once attained. This short system I have now perfected, and the book containing it is published under the title of "The Daily Five Minutes."

By performing the five minutes' table without apparatus or appliance of any kind, as explained in the book, every fit person can keep absolutely fit, enjoy life more fully and live a longer and better life. Further, if this short system is adopted as the basis of the physical training of school children, I am convinced the nation can and will be graded A.1. in the course of a few generations. Further still, any athlete making this short system the basis of his day's programme will redouble his chances of obtaining a championship and holding it.

I doubt whether it would be possible to select a table of exercises which would, in the same space of time, be more effectual and beneficial to the general health and all-round development, than these three or four tables of mine. It can be mathematically and physiologically proved that these five minutes have much more effect upon the most important muscles of the body and the vital organs than thirty minutes of any other method of school drill or calisthenics, even than the latest and most advertised "inventions." Several experts have admitted this, but, of course, not until they had actually tried to perform my table in a proper manner.

This Five Minutes' System has now been in use in Scandinavia for over nine years, with the most striking results. It

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is officially recommended by the Danish Board of Education and Muller Clubs have been formed in Copenhagen and Oslo for the purpose of getting it introduced into every school and home in the country. On the committees of these clubs are prominent medical men and both ladies and gentlemen of position and authority. There are now in various parts of the world Muller Institutes, where my exercises are taught by male and female instructors trained by myself. But since the patronage of H.R.H. the Prince of Wales was graciously granted for my works and books, and not for institutes, I am no more connected with this line of business. My eldest son, however, I. P. Muller, gives private instruction to single pupils or to classes, and lecture demonstrations to societies or institutions; his address is: Richmond Mansions, Denton Road, Twickenham (Mdlx.).

J. P. MULLER.

Cliff Edge,
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Bournemouth.

THE DAILY FIVE MINUTES.

CHAPTER I

SYNOPSIS OF THE VARIOUS FIELDS OF ACTIVITY OF THE FIVE MINUTES' SYSTEM

Whereas "*My System, 15 Minutes' Work a Day for Health's Sake*" (see page 119 for contents of the new revised edition) hereafter called "*The Long System*," must be used when ordinary chronic ailments are to be cured or bodily debilities and defects corrected, the new *Five Minutes' System hereafter called "*The Short System*," is:

- (1) SUFFICIENT FOR KEEPING FIT those persons of both sexes who are well and lead a fairly hygienic life.
- (2) THE TEST OF FITNESS, in that nobody will be able to carry it out correctly and in five minutes, unless he is fit and well. Everybody, then, ought to verify his own fitness in this easy and reliable way.
- (3) THE NECESSARY AND SUFFICIENT BASIS OF THE PHYSICAL EDUCATION OF SCHOOL-CHILDREN:
it develops their most important muscles and strengthens their vital organs, thus enabling them to stand the strain of athletics, strenuous games, and gymnastics (see page 33). It is thus a sort of *health insurance* not to be found in any other system of school drill.
- (4) THE MOST RATIONAL BASIS OF THE ATHLETE'S TRAINING (SEE PAGE 38).
- (5) A GOOD SUBSTITUTE FOR THE RUBBING EXERCISES IN VERY HOT CLIMATES. Persons living in such places and finding the rubbing unpleasant;

* The old five minutes table contained in "*My Breathing System*" is very mild exercises for beginners who later will go in for either the Long or the Short System.

owing to profuse perspiration, were hitherto recommended to do the exercises Nos. 9-18 of the old "Long System" without skin-rubbing, as described in "My Army and Navy System" but stripped. Hereafter they might, with the same benefit, perform the ten exercises of the new "Short System" instead of the above-mentioned Nos. 9-18 of "My System." In other words, they could combine the old exercises Nos. 1-8 and the "Short System" into a "Long System" most suitable for such climates, the whole series to be carried through, of course, stripped.

CHAPTER II

MAIN PRINCIPLES AND PRINCIPAL AIMS OF PHYSICAL TRAINING

MY OWN PRINCIPLES:

- (1) A complete, rhythmical and steady respiration during every kind of physical exercise is of more importance to general health than the correctness of the muscular movements themselves.

- (2) Any muscle not necessarily engaged and actually used for the performance of the exercise in question should be kept in a state of relaxation and repose.

All exercises and poses, incompatible with full and regular breathing—such as most of the Swedish—are in the long run harmful to the internal, vital organs: whereas any exercise, whatsoever its gymnastical “form” may be, is useful to the said organs, if full and regular breathing be an essential part of the exercise.

The second principle shows that my exercises are of quite a different nature from the Swedish: during the latter as many muscles as possible are constantly braced and kept in a state of exhausting tension, in order that it may always be possible to secure the exaggerated, rigid carriage, characterised by advanced chest, backward-forced shoulders, and inward-drawn abdomen.

- (3) As a third principle—in fact a logical consequence of the two first—it is to be noted that my exercises should be performed in a comfortable manner, adjusted to the natural, full respiration of the single individual. Hence, in classes when pupils are doing the same exercises at the same time, it does not follow that the various movements should be performed with absolutely simultaneous precision; this latter, again, is one of the main principles of the Swedish team drill, as used in every school. Such a homogeneity may be

very showy but will never produce health, vitality, endurance or fitness. On the contrary, if the teacher's attention be directed to the exact simultaneousness of movements, and not to the correctness of the pupil's breathing, the vital organs are easily strained, and consequently the general health jeopardised. It may be a magnificent theatrical ballet performance or a splendid military parade drill, but it certainly does not deserve the name of rational physical training of Youth.

THE FALSE PRINCIPLES OF THE SWEDISH DRILL:

As far back as 1904, in my first book, "My System," I maintained that the general physical education of children was absolutely wrong: the time was wasted by long lessons of Swedish Drill, not only tedious and tiring, but even harmful to the vital organs of undeveloped bodies. And I proved that playing in the open air, games and athletics, were the only rational physical training for children, when supplemented every day by a few minutes of free standing exercises for strengthening the heart, lungs, and digestive organs, and for the proper development of those muscles of the trunk which are not much used in ordinary games or in daily life.

I also pointed out, "the instruction should assist the physical development, not only during school years, but later in life as well. In most other subjects—reading, writing, and arithmetic, for instance—the pupil acquires knowledge of which he can make daily use in after-life. . . . The pupils must not only learn the exercises themselves in school: it must be impressed upon them that this little System must form and always remain a part of their morning or evening toilet. . . . A scholar who has had a physical education of this sort will really have brought out of his school experience something that will be of benefit to him through his whole life."

In the later books, "My Breathing System" (1914), and "My Army and Navy System" (1915), I proved more fully that the principles of physical training as followed in the schools were irrational, and, especially in the latter book, I put forward an explicit and scientific criticism of the Swedish Drill System (partly reprinted on pages 17-26), a criticism which nobody has

been able to invalidate. Also, in daily papers and periodicals, I wrote several articles on "The greatest mistake of modern Physical Education," or "The Swedish Militarism" (part of this is reprinted on page 26). A few teachers of this drill have abused me, but not a single one of my statements has been disproved. More than FIVE HUNDRED BRITISH MEDICAL DOCTORS have, in writing or verbally, admitted the correctness of my views; and it has been stated in medical reports and journals that the Swedish poses are "very injurious to the young, reducing the efficiency of the lungs, and inducing not only lessened ability to resist disease, but also a diseased or overstrained heart," and that "the excessive smartness of the Swedish Drill is an undoubted factor in generating heart strain in the very young."

My own experience further leads me to believe an appallingly great number of cases of constipation and other digestive ailments in young individuals are caused by the habit, acquired in Swedish Drill, of keeping the abdomen constantly indrawn, tense and rigid, a habit which kills the elasticity of the lower ribs, checks the movements of the diaphragm, and hinders the internal massage of the intestines and bowels, to which not even sufficient room is left for proper activity.

It is my experience that almost every habitual performer of Swedish Exercises, or of apparatus gymnastics, who visits my Institute, has lost the elasticity of the thorax and lacks the ability of relaxing the muscles. They may have very high arched chests and muscles hard as iron, but they are stiff-chested and muscle-bound. They possess a certain kind of strength, but they lack speed, stamina and suppleness.

ALL THE FREE STANDING EXERCISES ARE TOO SIMPLE:

Such may be all right for mere beginners; but as soon as the pupil has some training it is waste of time, because too little effectual work is performed in a given period.

To obtain a state of real fitness, under present conditions, the pupils must be drilled for about one hour daily, whilst the same result could easily be obtained by one-quarter of an hour's work a day or even less, if too much time were not wasted in

does not contain any combination of forward-backward-leaning and sideways-bending, nor of twisting and forward-backward-leaning, nor of twisting and sideways-bending. An example of the first of these combinations is my "trunk circling." Such combinations are much more beneficial to the internal organs and the spine, and to the trunk muscles as well, than simple movements. If, during such combined movements, a regular and very full respiration is maintained so that the lower ribs move freely inwards and outwards, and the diaphragm considerably upwards and downwards, then the internal massage thus produced will still more increase the effects.

The third reason is that there are no quick, uninterrupted trunk movements in the whole Swedish System.

The simple Swedish bendings (or leanings) and turnings are mostly performed very slowly. And when sometimes they are quick, it is in such a manner that the best effects, nevertheless, are lost. At "One" there is a bending from the vertical, then follows a short pause, and at "Two" another movement back to the vertical. Or, if turnings are performed, at "One" a turn from the front to one side, at "Two" a turn back to facing the front; then in the same fussy way to and fro on the other side.

It is just the checking of the movement and the *immediate* flinging in the opposite direction which means hard work to the muscles and their speedy development, besides effecting a considerable toning up of the internal organs, especially if simultaneous deep breathing, and consequently unrestricted work of the ribs and the diaphragm, be employed. As the Swedish System altogether lacks uninterrupted trunk-flings, it is a matter of course that it also lacks every combination containing such flings, which are rather difficult but very effective exercises.

And further, the quick, uninterrupted movements of the trunk, such as are performed in my exercises, are an enormous saving of time compared with the tediously slow Swedish manner of working. But here we approach the fourth reason of the ineffectualness of the Swedish trunk exercises, namely, that the number of repetitions of the various movements of the trunk is absolutely insufficient. Considering the slow performance,

or the numerous pauses it would, of course, take too much time to repeat a Swedish trunk exercise, say, 20 times. And how tedious! Therefore it is practically never done.

TOO LITTLE ATTENTION IS PAID TO CORRECT BREATHING DURING EVERY MOVEMENT AND TO FULL BREATHING IMMEDIATELY AFTER EVERY STRENUOUS EXERCISE:

I admit that in Swedish text-books it is generally advocated to keep up a steady respiration during all the exercises, "as much as the nature of these will permit"; but it is my experience that a pupil will never breathe fully unless he is specially taught in every single exercise where and how to inhale or exhale. And in most cases the breathing must be corrected again and again before it can be performed automatically. Such detailed instructions are quite possible in a system of only 10 or 18 exercises, but quite impossible in a system of far more than 300. Every time a pupil performs a new exercise, or one which is, as it were, new to him because several days have passed since he last did it, his attention will be concentrated on the correct performance of the movements, and he will not think of the correct way of breathing. Further, at the end of every Swedish lesson, and sometimes also at the beginning, we find introduced a single special deep-breathing exercise. But it is not nearly enough. After every rather hard exercise there is a natural desire to regain the breath by full respiration. These should be performed in a scientific way, and ought, therefore, to be ordered and controlled by the teacher. Hence it is wrong to force the pupils to stand at "attention" after the performance of an exercise which accelerates the action of the heart and lungs; and it is just as wrong to command "Stand easy!" and let the pupils take short gasps of air through the mouth in a half-slouching or nonchalant attitude.

Still another circumstance which contributes to the deficient breathing in the Swedish System is the stringent rule regarding the carriage of the shoulders and chest. To draw the shoulders back and arch the chest are good corrective exercises for round-backed and flat chested individuals. But this position should never be kept up continuously. Every time the breath is

exhaled the chest ought to be contracted and the ribs narrowed as much as possible. In the Swedish text-books we often read about the importance of widening the ribs and expanding the thorax, but there is nothing said about full contraction of the thorax, which is of at least equal importance. In my booklet on Breathing, I have proved in a special chapter that slow and deep exhalation is still more important than full inhalation. When, after exertion, much more air is needed in the lungs, it is in the highest degree desirable, and quite possible, too, to take very deep breaths. To the man who has learnt to breathe correctly, it will come quite natural to breathe extra deeply immediately after severe efforts. He will rather enjoy the opportunity, provided by his great need for air, of respiring as fully as possible, well knowing that it is the best means of steadying and strengthening the heart.

The average adult man respire 16 to 18 times per minute. When I sit at my desk, my rate of respiration is only about 14, because I have trained myself down to this slower rate. And after exertions, such as a 400 yards sprint or a sculling spurt in a "best boat," my rate will be only 10 to 12, but, of course, at such a time very full and deep. And it must here be remembered that such athletic performances are more exhausting for the lungs than any severe gymnastic exercise. To take short breaths in such a case is only a bad habit, which ought to be condemned, and not supported, by authorised text-books. The main point is, during the exertion itself, to pump as much air as possible into and out of the lungs by aid of breaths which, although rather quick, should also be full. If this is correctly performed, there will be no very great need of an extra supply of air at the moment the exertion ends; whereas persons without special education in breathing are always more or less "out of breath" after such heavy exertion and therefore compelled to gasp for air. The aim, therefore, of the special deep breathings immediately after exertion should not be to continue the forced change of air in the lungs—but to calm the heart by making the respiration as full and slow as may be done without any strain.

DEEP EXHALATION IS ESPECIALLY NEGLECTED:

It is always forgotten in the Swedish System that to a mobile thorax the ability of complete contraction is even more indispensable than expansion, and that these two processes ought always to follow upon each other in a certain regular measure.

Now, such contraction of the chest is not even prescribed in the poses of Swedish Exercises which are pronouncedly apt for expiration. There will never, in the Swedish manuals, be found any advice about exhaling in such positions. As an example, I refer to the exercise "Trunk bending forward," in that I think everybody must admit that forward-bending induces expiration, while backward-bending induces inspiration. The detailed description of the above-mentioned exercise is in most Swedish manuals as follows: "Incline the trunk slowly forward from the hips, keeping the back straight, the chest advanced, and the head in the same relative position as at attention." But to keep the chest advanced is just the opposite to contraction.

Now some Swedish expert will perhaps object that this "Trunk bending forward" is used—or ought always to be used—as a starting position for a "Trunk bending downward," during which there may be expiration, so that it would be quite rational to inhale while taking up the starting position. But we will soon see that this argument is false, because the detailed description of the "Trunk bending downward" is as follows: "Incline the body downward from the hips as far as possible without rounding the back or contracting the chest." And to forbid contraction of the chest is just the same as forbidding expiration.

SPAN-BENDING EXERCISES ARE IRRATIONAL:

To be rational, any gymnastic exercise must possess one of the two following essentials: It ought to be of such a nature that the various movements of it automatically induce alternate full inhalation and deep exhalation. Or it should be equally easy to perform either full inhalation or deep exhalation during any phase of the exercise. Neither of these claims being fulfilled in the

Span-bending Exercises, we must consider this whole group as irrational gymnastics.

The position of every Span-bending is pronouncedly one of inhalation only. To remain in such a pose for a rather long period (practically from 10 to 30 seconds) without any opportunity of full contraction of the chest with deep exhalation will always induce the performer to retain the breath, or at all events to take very short breaths, thus causing a strain on the heart and emphysema in the lungs.

Further, according to the Swedish text-books, the aim of the Span-bending Exercises is to produce a backward arching of the upper dorsal spine, and to raise the upper ribs and thereby "increase the capacity of the thorax." But the backward arching of this part of the spine is quite unnatural. It disturbs the real beautiful carriage of the body, causing an artificial stiffness of which we never find any trace in the best antique statues, usually considered to be the ideals of human beauty and ability. As to the intended increase of capacity of the thorax, this can be brought about much more easily and more completely, simply by lifting the shoulders and the upper chest straight upwards.

THE ARRANGEMENT OF THE SWEDISH "DAILY LESSON" IS HUMBUG:

Nothing has contributed so much in granting an air of pseudo-science to the Swedish System as has the artificially built up Swedish "daily lesson." The task of imposing on laymen was, of course, easy. It is more surprising that so many scientists have been uncritical and unable to think independently in this matter. This "daily lesson" must, according to the Swedish text-books, be commenced with easy "Introductory Exercises," "to prepare the body gradually for stronger work." Then follow so-called "General Exercises" which should gradually increase in vigour and severity; whereupon the lesson is concluded with easy and quiet "drawing-off" or "Final" Exercises, of which the aim is to "restore the accelerated circulation to its normal state, thereby avoiding too sudden a passage from the harder work to other occupations, so that the pupils should feel no undue agitation or fatigue afterwards."

This sounds very edifying and scientific. And I am also

ready to admit that the number of young people with hearts injured by Swedish Exercises would have been much greater if there had been no such precautionary rules.

But let me state here that in a system of exercises where due attention is paid to correct breathing, such an artificial scheme is quite unnecessary and superfluous, and only a waste of time.

If deep and regular respiration is employed in the manner most suitable for every single exercise, and maintained under the control of the instructor, no harm at all could be inflicted by starting with a rather vigorous exercise. The pupils would then, while performing the first movements, acquire the habit of inhaling a little more air than is for the moment needed. They would thus escape breathlessness and oppression of the heart and they would be better trained to withstand all sort of hardships under games and athletics where "Introductory Exercises" are not always convenient.

The more advanced degrees of Exercise No. 1 of "My System" are very strong ones, judged by the Swedish scale. They have now been used for over 25 years by millions of people as a starting exercise, even in the early morning on an empty stomach; but I have never heard of any inconvenience arising therefrom. On the contrary, thousands of weak hearts have been strengthened, simply because my exercises are strictly combined with regular deep breathing.

Furthermore, regarding "Drawing-off" or "Final" Exercises, it is certainly wrong to place them only at the end of the lesson, even when training advanced pupils.

There ought to be a "Drawing-off" Exercise immediately after every single one of the more strenuous general exercises, such as is the case in my Systems. Only the name is different, in that I call mine a "Deep-breathing pause" or "Special deep-breathing exercise." And when a whole series of "Drawing-off" Exercises is put in the end of a Swedish "daily lesson" of a rather strong degree, I feel tempted to call them "Sweat-absorbing Exercises," because the perspiration, caused by the vigorous exercises in the middle of the lesson, will evidently become absorbed again into the skin during this series of mild final exercises.

It may then justly be said that such an arrangement is irrational and unhygienic.

To let the perspiration dry on the body in the quiet movements or rests that follow on exertion is very unpleasant and also dangerous; colds, rheumatism and even pneumonia being frequently caused thereby. After vigorous exercise the pulsation of the heart should, of course, be almost normal again before a cold bath is taken. But for this purpose a few deep breathings are sufficient.

MILITARY DRILL AND PHYSICAL TRAINING CONFUSED:

Swedish and other Military Drill, and physical training are two essentially different things, so that one of them must always suffer by their being combined. The aim of Military Drill is Discipline and certain other military qualities, whereas the purpose of Physical Training is Health and Fitness.

The inventor and propagandists of the Swedish system of so-called "Educational Gymnastics" never intended it to be physical culture; at all events, not in Sweden, nor in any other conscript countries. This has been confessed quite recently in a book, "The Special Theory of Gymnastics," by the medical Dr. Professor J. Lindhard, who occupies the chair of Swedish Drill at the University of Copenhagen. He says on page 8: "Whether this Drill also produces Health, or acts prophylactically against common ailments, must no doubt for the present remain an open question; so far as I know there is no series of statistical observations forthcoming in that particular." And on page 62: "We know nothing precise about the importance of the Swedish exercises for the Health. No material is forthcoming for the judgment of this question."

Furthermore, it was always understood in Scandinavia that Swedish Drill was strenuous and rather dangerous, therefore weak school children were regularly exempted from its practice. Such children, of course, sorely needed physical culture, yet they got none. A third proof that Swedish Drill was not meant to cure ailing bodies or increase health, lies in the fact that the Swedes have a special system for this purpose, namely, their "Sjuk-gymnastik" (wherein the limbs and body of the patient

are moved and massaged by another person, the trained masseur).

In no country is this military drill more strictly obligatory in the schools than in Sweden. The children consequently acquire an early hatred for these tedious exercises, and very rarely practise them voluntarily in after-life. Thus we see the curious fact that no country has fewer voluntary gymnastic societies than Sweden itself. This is great luck for the Swedes, but unlucky for all the other countries which adopted this dangerous drill. They would certainly have been warned in good time if they had been able to see the disastrous effects in Sweden of life-long performance. As it is, the colossal mistake of confusing drill and health exercises has caused the loss of life or well-being to many thousands of young people.

A "PEACEFUL PENETRATION":

The headquarters of Swedish Drill is the Central Institute at Stockholm, where for generations a great number of instructors (so-called gymnastic directors) have been hatched. To get good markets for the over-production, a general propaganda was started and maintained over the whole world, not much less energetic and cunning, nor more free of scruples, than the well-known German "commercial penetration." The Olympic Games were especially used as the very finest advertisement. Every means was employed to secure first prize for the Swedish Drill, that is to say, teams of professional instructors were sent to compete with the amateurs of other countries; the committees and judges were worked upon for years in advance.

THE NEW DANISH LAWN GYMNASTICS:

In "Lawn Gymnastics," by Capt. O. B. Muller (published by Jul. Gjellerup, Copenhagen), is explained and shown by 212 illustrations from photographs how it is possible to perform upon any lawn, bare field or play ground, all the exercises hitherto done in the vitiated air of the gymnasium, with beams, wall bars, horse, buck, box and other apparatus, and further, a number of quite new exercises and games. Country schools with no

gymnasium will, hereafter, be deprived of their excuse for having no gymnastics or physical training on their programme.

Most of the exercises are performed with the mutual support of the pupils, in that half the number of them in turn play the rôle of an apparatus, and thus develop another set of muscles. The "apparatus" must constantly assist the performer: as playmates they accommodate themselves to each other, thereby introducing a very important feeling of belonging to each other and of co-operation, a trait of character hitherto missed in the usual gymnastics.

Previously to publication, this Lawn Gymnastics was tried and regularly used at Sorø Akademi, the Danish "Eton," where it proved itself much more interesting to the pupils and more health-giving than the old indoor-gymnastics. The book will as soon as possible be translated into English. With my "Five Minutes" as the natural basis, the "Lawn Gymnastics" is sure to be part of the more advanced gymnastics of the future, not only for schools, but also for the Army, Navy, scouts, and gymnastic clubs.

CHAPTER III

MY CLASSIFICATION OF FREE STANDING EXERCISES.

Breathing Exercises are the most important of all, and this is true to such an extent that it does not suffice to say they should form the main group of physical exercises.

I go still further, and assert that every exercise should simultaneously be a deep-breathing exercise. Or, in other words, the first rule for rational physical training is that the breath should be taken—or the respiration continue—fully, regularly and steadily *during* all sorts of movements, including the quickest or most strenuous, or even the irregular ones. Therefore, never hold or retain the breath, and never take short gasps!

Thus, all my exercises are breathing exercises. I put them in two main groups, according to the relation between the movements and the breathing. The first main group is, "*Slow Exercises*," i.e., those in which the movements of trunk and limbs follow the measure or rhythm of the individual's natural and full respiration. The second consists of, "*Quick Exercises*," where several repetitions of the movements are performed during inspiration and several during expiration. Such exercises will not be found in any other "System" hitherto known, but they are of the greatest importance, especially the quick and uninterrupted trunk movements which have an enormously beneficial effect upon the health of the internal organs and the strength of the most important body muscles.

Now, both of these two main groups are divided into the same four sub-groups, viz.:

(1) Trunk movements; (2) Stretched limb movements; (3) Bent limb movements; and (4) Movements of neck, ankles, wrists, fingers and toes.

The first of these sub-groups is by far the most important for health and fitness. And the second is generally of more importance than the third, because a stretched arm or leg is

always moved by muscles situated upon the trunk, whereas bending of a limb is performed by the muscles of the limb itself. I use the word "generally," because there may be exceptions to this rule. A Bent leg movement may, for instance, be more important than a Stretched arm movement, because much larger muscle groups are used.

To perform the movements of the fourth group as special exercises, as in all other "Systems," is waste of time for a busy person not suffering from any special weakness. It is sufficient to move the neck, ankles, etc., simultaneously with other more important movements.

Arm movements, especially Bent arm movements, are not of very much importance for health and general fitness. Whereas in the "Long System" I have one special arm exercise, in the "Short System" all exercising of the arms is done simultaneously with trunk or leg movements, whereby much time is saved. All the organs of breathing, circulation, digestion, etc., being situated within the trunk, these are squeezed and massaged, and consequently toned up through the various trunk movements. Hence their great value in promoting general health and fitness.

Now, there are three primary forms of trunk exercises, viz.: (1) Backward-forward bendings, or movements in the vertical sagittal plane; (2) Sideways bending, or movements in the vertical frontal plane; and (3) Twistings or Turnings, i.e., movements in the horizontal plane.

To be rational and scientific, any course of "system" or table—even the shortest one for beginners in physical culture, or for babies—should consist mainly of exercises belonging to these three primary forms of trunk movements.

SYNOPSIS

A. BREATHING EXERCISES

1. *Slow Exercises.*

a. Trunk Movements.

1. Backward-forward bending.
2. Sideways bending.
3. Twisting.

- b. Stretched Limb Movements.
 - 1. Leg raising, leg circling.
 - 2. Arm raising, Arm circling.
 - c. Bent Limb Movements.
 - 1. Knee raising, Knee bending, Squatting.
 - 2. Arm bending, Arm slapping.
 - d. Neck, Ankle, Wrist and Finger Movement.
- II. *Quick Exercises.*
- a. Trunk Flings.
 - 1. Backward-forward leaning.
 - 2. Sideways flinging.
 - 3. Turning.
 - b. Stretched Limb Movements.
 - 1. Leg raising, Leg swinging.
 - 2. Arm circling.
 - c. Bent Limb Movements.
 - 1. Knee raising, Knee bending, Squatting, Kicking.
 - 2. Arm punching, Arm pumping.
 - d. Ankle and Finger Movements.

B. OTHER EXERCISES

(not combined with Breathing).

Not used in my " Systems."

CHAPTER IV

GENERAL REMARKS ON THE "SHORT SYSTEM"

THE DIFFERENT MERITS OF MY TWO SYSTEMS:

Since 1904, when "My System" (the "Long System") was first published, some millions of people all over the world have practised this "15 Minutes' work a day for Health's sake." It is an established fact that this "System" supplemented by a short daily walk in the open, not only keeps the individual fit, but even cures most of the ordinary chronic ailments.

Notwithstanding the evident benefits derived from the "Long System," there are, unfortunately, still too many persons who think they have not time to spend 15 or 20 minutes a day upon it.

A good many do nothing at all, and several only perform the first eight exercises. Now, this latter is also wrong, because these eight exercises do not form a systematic whole (e.g., quick trunk movements are lacking). The ten rubbing exercises could better be used alone, as a separate system, and I know there are some people who do so.

The old "Long System" is arranged for individual use in one's own privacy. A few pieces of furniture are necessary, and to perform the latter half, the Rubbing Exercises, one must, of course, strip.

The new "Short System" is based upon the experience gained during the last 26 years, when I have been solely occupied with the study of physical culture and have had an unique opportunity of examining thousands of adult pupils and numerous children of all ages and of all sorts of physical conditions. The acknowledged good qualities of the "Long System" are here condensed into the very minimum of exercise by which permanent fitness can be maintained by persons who are naturally healthy, or who already have cured their chronic ailments through following for some time the longer course of 15 minutes.

These new five minutes are thus the quintessence of the old 15 minutes, with some quite new leg exercises added which form a good preliminary training for all outdoor games and will further strengthen the leg muscles of the athlete. And sufficient exercise is thus given also for motorists, flying men and other persons who suppose they have no time or opportunity even for a short daily walk. The "Short System" can be performed by everybody, and anywhere; by single individuals at home or during business hours, in the garden or on the beach; by soldiers in their thousands upon the parade ground; by sailors on the deck, and so on. No apparatus is needed, not a single piece of furniture or any support is used, it is not necessary to undress, and none of the exercises are performed sitting or lying upon the ground (which may often be wet or dirty). If you have not had time in the morning at home, it is easily performed during five spare minutes at the office. The morning is, however, the best time; even for the busiest man, the immediate result will be a *Saving of Time*, which sounds paradoxical, but is true. A proper start is given to the day's work, the body becomes charged with energy, and working power, a feeling of high spirits, buoyancy, agility and stamina are engendered, so that as a result during the day more and better work is done, and with less tiredness.

THE MOST RATIONAL BASIS OF PHYSICAL TRAINING OF CHILDREN; BOTH BOYS AND GIRLS:

It will teach them—or rather force them, until the right habit is established—to breathe fully, regularly and steadily even during the quickest and most irregular movements of the limbs or trunk; it will develop and strengthen all their most important organs and the muscles of the trunk, thereby enabling them to stand the hardest efforts without the slightest risk, when, later, they indulge in athletic games and take part in strenuous competitions.

School children do not need an expensively equipped gymnasium for the performance of the "Short System." They can do it on grass, pavement or gravel, or—if it rains—in the vestibule or in the class-room, between two lessons.

Whereas the protracted lessons of the tedious Swedish Drill

make the pupils slow, stiff-chested and muscle-bound, ruin the best qualities of the coming athlete and produce an aversion to any form of regular physical culture in after-life—my "Short System" is specially designed for the purpose of keeping heart, lungs and digestive organs in perfect order, and of developing speed, quickness and endurance of muscle. The exercises themselves contain movements selected from the most popular games (football, boxing, tennis, golf, swimming, running and skating).

And, occupying—when first properly learned—only five minutes a day, the exercises will scarcely ever become tedious. The pupils may be exhorted to do the exercises in an always more and more improved manner, because there is almost no limit how correctly some of the exercises, or how quickly and strongly others can be performed by constant practice. Quick and powerful movements can be repeated many times without the pupils becoming breathless, because complete respirations are maintained through the whole performance, simultaneously with the muscular movements.

In Swedish Drill, an enormous time is wasted in enunciating the complicated words of command. In the "Short System" the pupils soon become so proficient that they can do the exercises automatically and remember their sequence, so that no time at all is wasted in giving orders. The teacher can then concentrate his attention on controlling the respiration of the pupils.

Until the exercises have been learned, pauses must, of course, be made for correcting faults and explaining points to be observed. While this is in progress, the teacher would allow the pupils to rest as they like. Speaking generally, the worst fault would be to maintain the unnatural carriage of the Swedish position of "attention." During every expiration throughout the performance of my exercises, the whole body should relax and several muscles become flaccid.

HOW THE "SHORT SYSTEM" IS COMPOSED AND GRADUATED:

It consists of 60 full respirations during which ten exercises are performed. Thus six respirations are allotted to each

exercise. The strength, or difficulty, of the exercises can be modified almost infinitely, but there are three main degrees, the first, or easiest, for beginners, women and young children, the second for stronger children and more advanced adults, and the third for trained athletes. But all beginners, athletes included, must start with the first degree, in order to acquire the habit of correct breathing, and then gradually work up to the final degree.

Anybody who may wish an individual table for himself, can, in each of the ten exercises, choose the degree which suits him best, or which he likes most. When we consider not only the three main degrees but also the extra ones, and the "duplicate" exercises as well, it is thus possible to create 6,531,840 different tables, so that, as a matter of fact, almost every single one of London's seven million inhabitants could have his own special table.

The first five of the ten exercises are always slow—i.e. in each degree and in any individual table—and they should be repeated six times, once to each respiration. The last five exercises are always quick, and each of them is performed with as many repetitions as possible, during the first four respirations, with a pause during the remaining two breaths.

Each group of five exercises, or in other words both the slow first half of the System and the quick second half as well, consists of one "Stretched Leg" exercise, three "Trunk" exercises, and one "Bent Leg" exercise. The three Trunk exercises are, in both the slow and quick halves of any degree or table of the System, first a Backward-forward bending (or leaning), then a Sideways bending, and finally a Twisting (or Turning). This arrangement makes memorising the whole table very easy. Sufficient exercises for the arms (both "Stretched Arm" and "Bent Arm" movements), neck, ankle, wrist and fingers are performed simultaneously, with the trunk and leg exercises.

Ten times as many trunk movements are performed in any table of this "Short System" as in an ordinary half-hour's lesson of Swedish Drill, therefore, in a corresponding space of time, there are 60 times more trunk movements. Seeing that trunk movements are by far the most important for general health and

fitness, it is no wonder the populations of all nations using Swedish Drill as physical training for their school children, are still C8 instead of A1.

HOW TO DO IT CORRECTLY AND IN FIVE MINUTES:

The private adult person who wishes to learn the "Short System" on his own account, by studying this manual, must, of course, not expect forthwith to be able to finish the whole series in five minutes. It may take the beginner ten minutes or more.

So do not be disheartened by looking at the watch at the first trials. When all the ten exercises have been learnt by heart and their right sequence remembered, and when correct, full breathing during all the movements comes naturally, then the time has come to use the watch and try to improve the record. If, then, there is no hesitation in passing from one exercise to another until the whole series are completed during sixty full respirations, five minutes only will be spent in the performance. But here I must point out, persons who have learned the "System" by heart and can perform it, without blundering, in five minutes, should not fall into the error of thinking it would be praiseworthy to occupy even a shorter time. This is not so, but rather the reverse, because it would only prove their respirations were too short. The effect on the "slow" half of the system would, perhaps, not be so detrimental, but the quick half would suffer the more, in that too few repetitions of each exercise would be made.

On the other hand, it would not be wrong if very practised performers, with a big lung capacity, occupied five and a half or five and three-quarters or even six minutes, so long as no more than 60 breaths in all were taken, and no other pauses were made than the deep breathing ones after the five "quick" exercises.

To athletes training for such special feats as climbing Mount Everest I would recommend trying to make the 60 respirations last $7\frac{1}{2}$ minutes, thus taking only eight breaths per minute during hard exercise!

Whereas school children will take to these exercises as young ducks to water, I know the average adult individual has several questions which he would first wish answered.

IS IT WRONG TO EXERCISE ON AN EMPTY STOMACH?

No, it is not wrong to do a few minutes' exercise before breakfast. It is actually the very best thing for "fairly healthy" persons. They will thereafter go to their day's work fresh in body and mind, and with a good conscience, because they have done their duty to their physical self: e.g., boxers and other athletes always do much better work on an empty stomach, and compared with the protracted and strenuous exercise performed by them, the "Short System" is only a bagatelle.

In the dark and cold seasons when naturally there is a desire to stay in bed as long as possible, the "System" can be done in the office immediately before lunch. At that time, perhaps the individual may feel chilly, but the exercises will give warmth without causing perspiration. The coat only need be removed.

Or they may be done at night just before going to bed if at least an hour has elapsed since the evening meal.

AM I NOT TOO OLD TO COMMENCE PHYSICAL TRAINING?

How do I know? That depends upon yourself! A person's age tells nothing about his ability to stand physical exertion. I have seen "young" men of seventy or eighty doing my most strenuous exercises, and, I am sorry to say, I have had pupils of thirty who were "old" wrecks. However, experience has proved that the exercises of the "Short System" can, if correctly done, be performed with the greatest benefit by anybody from five years to eighty-five, if they are "on their feet" and "fairly healthy."

HOW CAN FIVE MINUTES' EXERCISE HAVE SUCH A GREAT EFFECT?

To do the slow Swedish Drill for the same short period will not be of much benefit to health and general fitness, nor will the popular arm exercise with dumb-bells or with the so-called chest-expanders, nor a five minutes' walk.

It goes without saying, in order to derive the greatest benefit, the five minutes must be used in a perfectly scientific manner:

the exercises done must be the most beneficial for the purpose. They should be those most effective for improving the work of the heart, lungs and other vital organs, for increasing the circulation, digestion and metabolism, and for toning up all the processes through which body poisons and waste matters are eliminated. Besides, every single muscle and joint of the body should be exercised in turn, *but in due proportion to its value for the general health and vitality*. These are what have been my leading principles in the selection of the exercises forming my "Short System."

A WORD TO THE ATHLETES:

Young persons going in for athletics are inclined to forget the importance of the initial training which should strengthen the vital organs and thus fortify the general health: they are more often than not too eager and want to start in junior competitions and handicaps before they are really fit for them, and, as a rule, they only wish to practise in their specially chosen event. But this is absolutely wrong: experience has shown that the best "specialists" are found among those who possess the best all round development and the soundest internal organs. The coming athlete may have acquired a faultless style, splendid technique and a thorough knowledge of all the fine points and "tricks" of his sport; if he be lacking in general health and real physical culture, his success—if any be attained—will be of a very short duration.

And the athlete of more advanced age or of longer experience, unfortunately, too often only practises his own speciality and tries further to develop the necessary muscles. But if he do too much of such special or one-sided work, he will be inclined to put undue strain and stress upon this part of his anatomy and, perhaps, grow tired and stale.

Such special training, then, will not keep him thoroughly fit and healthy. It must be supplemented by some other exercise for the general circulation and metabolism, for the health, hardiness and fitness of the entire body and the internal organs. Otherwise, the athlete may break down or become ill before the time for the real contest has come.

I have often seen persons who suffered from indigestion,

though they walked four to eight miles a day, and I know of long distance runners suffering from constipation. A man who runs a mile a day has, of course, strong leg muscles, but the arms may be weak, or what is more frequent, the trunk muscles and some of the most vital organs may be unhealthy. He may even have misused his heart and lungs.

The practise of my "Five Minutes" will develop and strengthen all the most important muscles and organs and teach—rather force—the performer into the habit of breathing fully, steadily and regularly even during the quickest and most irregular movements of the limbs or the body, thereby enabling the heart and lungs to stand the strain of the most severe or protracted competitions.

DOES THE ATHLETE DIE YOUNG?

I owe the health and strength of my 63 years first and foremost to the athletics which I taught myself as a weakly boy from small British manuals, and seeing what enormous benefits I had derived therefrom, most years of my youth and early manhood were devoted to teaching these athletic sports to my young countrymen, and making the public and the authorities of Denmark interested in this hitherto so neglected part of their education. To-day I think I may be proud of the good results of my work, and what always makes me most happy are the many signs of gratitude from my countrymen, which culminated when the King of Denmark made me a Knight of the Order of Dannebrog on the 25th anniversary of my first introduction of athletics into Denmark.

I am convinced of the fact that this "mania for exercise" is a very good thing, a most valuable asset for the white race, but, on the other hand, it cannot be denied that too many thereby hurt their health and shorten their lives. The fault lies not in the "mania" itself, and it is absolutely absurd to blame the splendid sports and games as such. The causes of failure must be sought in the frequent lack of common sense during, or after, the performances. For instance, the strong athlete who so often has beaten his competitors and the elements will sometimes grow a swollen head and think he can stand anything—even transgress the laws of hygiene and Nature.

He will go round boasting how much wet clothing he can endure, how little sleep he wants, etc., etc. Alas! one day the bacilli will surprise the strong man in a temporary state of weakness, whereas the non-athlete who has been coddled from the cradle will always be over-cautious and careful and never run a risk. Further, many active and powerful athletes suddenly settle down to a sedentary life. All the vital organs now miss the great stimulus of the daily vigorous exercise, with the result that they soon grow slack.

The former athlete indulges in the same strong and good living as before, but without proper exercise the eliminating organs are not able to do their duty in the long run, the system is by and by poisoned thoroughly, and chronic ailments develop. Whereas the non-athlete (who never lived but only vegetated) pursues his uninteresting physical career undisturbed up to an old age, and is proudly exhibited by scribes, who, from time to time, in the columns of our daily papers state that athletics do shorten life.

By far the most failures of both old and young athletes are due to unscientific use of the vital organs, especially the heart and lungs. Teachers and trainers may be perfect in the tuition of all technical points of a game, but they very, very seldom teach their pupils how to breathe during exercise. A few young athletes will do it correctly by sheer instinct or sub-consciously, and it is from these that the lasting champions are recruited. The rest may win some successes before they succumb to heart or lung diseases. The most common fault is that only part of the lung is used and thus worn out too soon, while the remainder is atrophied. Simultaneously the resulting short and quick breath causes a too quick and irregular heart beat. Or the bad habit of holding the breath during efforts will cause the heart to be dilated. Or the too restricted movement of the ribs will cause the chest to grow stiff, so that the lungs, heart, and arteries will lose elasticity, while the liver, stomach and bowels will miss the internal massage and grow slack. Even several of the strong veteran oarsmen and athletes who die at the age of seventy would certainly have enjoyed life and games until ninety if they had understood how to keep themselves elastic and young inside.

Let me emphasise that the worst error of an athlete is to believe that Swedish calisthenics or military drill is healthy. The permanently "chest out, stomach in," superstition has ruined millions of vital organs. Two main rules for an athlete who wants to keep fit and elastic for a long life are: *Slack down the carriage, make yourself as narrow-chested as possible, and let the abdomen protrude relaxed each time you exhale the air during exercise.* You then get rid of more foul air and make room for more fresh air, and the intestines will get internal massage and more room for working. The other rule is: *Always relax the muscles not used for the moment in the performance of a movement.* They will then follow the command of the nerves much quicker and they will keep their strength much longer. There are hundreds of young and old athletes with muscle-bound arms, but there are thousands with respectively muscle-bound (rigid) abdomen and chest. During exercise the abdomen should always be kept relaxed as much as possible. There are, of course, such exceptions as the recovery in rowing, and infighting in boxing, where the abdominal muscles are either naturally much used or voluntarily made tense. Many athletes use the abdominal muscles for balancing the trunk and keeping the body upright, but this is wrong; the muscles of the flanks and lower back should be used to this purpose, so that the work of the soft, vital organs in the abdominal cavity is not interfered with.

Now, when the abdomen is kept relaxed, it will naturally flatten somewhat during inhalation when the ribs are much expanded. But during deep exhalation, when the ribs are completely contracted, the abdomen will move outwards in a state of softness—i.e., protrude—without being intentionally pushed out. Only athletes who are muscle-bound and rigid in the abdominal muscles are unable to relax these muscles, and must therefore in the beginning try to distend the abdominal wall by muscular force.

It takes sometimes weeks or months until this relaxation is learned. But any athlete who wants to have full control over the abdomen, with good digestion and proper and easy action of the bowels, must learn it. Several athletes with internal troubles, caused by a rigid and indrawn abdominal

wall, have been cut open by surgeons, who removed part of the big bowel (in order to produce a "short cut," imagining this to be an improvement upon the work of the Creator). Learning to relax the abdomen would certainly have cured the trouble with less risk of life!

Several thin athletes with constantly hard, rigid, and conspicuously knotted abdominal muscles believe, and make others believe, that such muscles are strong. But they may really be so weak that the whole trunk trembles when it is raised slowly from recumbent into sitting position, with feet fixed or supported. The strongest, quickest and with most staying power are those muscles which are quite soft when not used or not being voluntarily and momentarily contracted.

To have full control over the abdomen, an athlete should be able to distend it completely, and in turn draw it inwards considerably. And in both these extreme positions, and in all intermediate positions as well, he should be able to relax the muscles and in turn to contract them. It is therefore easily misunderstood when using the expression "contracted abdomen" as synonymous with "indrawn abdomen"; the muscle fibres of the abdomen can be contracted and hard even when the abdomen is utterly distended.

It is the Swedish drill, as taught in the schools and in the Army, which is responsible for the superstition that it is beautiful to have the chest constantly arched and the abdomen constantly drawn in, and for all the troubles and ailments which follow this bad habit and unnatural bearing of the body. It is certainly wrong to have a too large, distended or fat "tummy." But it is just as wrong to be hollow in this part of the anatomy. The happy medium is here, as anywhere, the healthiest state of things.

The belief that the abdomen should be drawn in when exhaling is very common, and also widespread among athletes. It is true it is possible partly to exhale by drawing the abdomen inwards, in that the displaced intestines then press the diaphragm upwards, whereby the lower lobes of the lungs are compressed and emptied. But unfortunately the action is limited to this part of the lungs, whereas when the ribs are contracted completely both the lower and middle lobes of the

lungs are emptied. Just the drawing in of the abdomen impedes the ribs from being contracted, in that the muscles and intestines simply come in between the walls of the thorax.

HOW TO KEEP FIT 365 DAYS A YEAR

(reprinted from the "Pictorial Magazine" of July 1st, 1922)

Some folk are born lucky! Ill-health seldom troubles them. But there are many thousands less fortunate who are to-day engaged on a quest as old as the quest for happiness—the search for the secret of good health, for the one is surely consequent on the other—and failing!

It is about this time of the year that they go in search of it. I speak of the holiday season. It is an amazing fact that most people look on their annual fortnight's respite as something which will "keep them going" until the holidays come round again the next year.

There are two ways in which it affects the average person who leads a sedentary life. There is the case of those who sit in an office for the odd fifty weeks of the year, and when their vacation comes, off they go and fling themselves into pleasure—bathing, rowing, long walks, and the hundred-and-one other strenuous delights of that frantic fortnight.

Then they come back to the office, looking brown or red, as the case may be, and, slapping their chests, they say: "Done me a world of good. Never felt more fit in my life!"

Yet a week later they are just as liverish as they were before, and feeling a great deal less like the day's work.

The other side of the picture is slightly different, but points no less to a moral. After a day or two of the strenuous pleasure round, the man on holiday takes more frequently to his deck-chair. He does not feel so inclined to take the air on the cliffs, or a refreshing bathe in the briny.

"Feel too beastly tired!" he says, by way of explanation. "The air here is too strong for my constitution!"

Which, of course, is not the case at all. It is the reaction which causes "that tired feeling."

The fact of the matter is that people bring out their healthy habits during the holidays, and put them away as soon as they go home again.

They are harnessed to a more or less sedentary occupation, where the daily does not entail much exercise, and then, when they go home in the evening, they either go to some house of amusement, or "take it easy."

In the case of thousands, they do not even walk to their work—indeed, how often do you hear people boasting with satisfaction that they are carried "from door to door"?

However, when these same people go on holiday, they get up early, go to bed late, and cram as much movement into the intervening hours as possible. It is a fact that holidays, to such as these, are more harmful than beneficial. Good health does not consist of a lobster complexion.

There is another class of holiday-maker who says: "I'm going to have a complete rest. It's what I most need." And he does. He browses in a deck-chair in the sun, trots into meals and out again, and whiles away the days. He comes back to the office looking a bit more corpulent than before, but is he much more eager for work?

I think not. A month will see him again complaining of that tired feeling, and not one whit more energetic.

What, then, is the ideal holiday to make you fit? I am going to suggest a remedy that is right off popular notions. Instead of relying on your holidays to make you fit, why not make yourself fit first, and then enjoy your holiday as it should be enjoyed?

But how to get fit first! Perhaps I may as well say right here that fitness does not necessarily mean brawn. The possession of a good digestion, sound lungs, and a well-regulated heart, are the first essentials to good health.

There are far too many people who, thinking to benefit themselves, rush to get dumb-bells or Indian clubs, and, without any preliminaries, start off on a strenuous course of "physical culture." They perform all kinds of injurious movements, and exert themselves so unduly as to strain or otherwise impair a vital organ—principally the heart or lungs.

Very few people even know how to breathe properly when exercising their limbs, of which fact I have had ample proof with the pupils learning my own physical culture system. Imperfect breathing causes faintness.

Therefore, since fitness means a healthy body, why not give yourself a little time each day to perform a few beneficial exercises? You may be able to spare a quarter of an hour. It may be only five minutes. But, however long, put those minutes aside and use them regularly, and, above all, make proper movements. Any old contortion won't do.

All physical exercises of this nature should consist mainly of trunk movements. Take up an easy stand and bend the trunk backwards and forwards and sideways. Then twist it from side to side, at the same time making arm movements such as outward fling, and so on. Next in importance come leg exercises. and last of all arms.

For persons who can only spare a limited time each day for exercises, I always advise the introduction of more than one movement at a time, as, in the first place, they get more actual exercise in the time which they give to this form of culture, and in the second, I think more benefit is derived from making combined movements.

These, and other motions, if performed correctly, will keep the inside organs working perfectly. They improve the circulation, and bring into action parts of the body which would not otherwise be used sufficiently.

The brawn can come later. There can be no imposing array of muscles without a sound constitution to build them upon, but once good health is obtained, strong limbs develop as a matter of course. It would be like attempting to build an imposing-looking annexe on to a tumble-down shack.

Then, when you are feeling the benefit of your efforts, you can look forward with pleasurable anticipation to the summer holiday.

No longer will you spend the first week of it in getting ready to enjoy it, and then, when you are feeling it is doing you good, have to return home.

You will feel fit before you go. You will enjoy it from the minute you start off until the time you return, more robust than ever. For even to the healthy person there is always the necessity to keep healthy.

Another thing I should like to mention is this: Take back some of your holiday habits with you. A sufficiently-opened

window is just as necessary in London as at Llandudno or Burnley or Blackpool. And don't give up that "after-supper-walk-a-mile" habit which is so popular at the seaside. It is conducive to a good night's rest.

Apart from the exercises which I have mentioned, and which help, among other things, to ward off indigestion, there is one holiday habit in particular which many would do well to carry home with them. I refer to meal-times.

The man who ordinarily gets up late and has to scramble down a few mouthfuls of food while he finishes dressing in the morning, and then dashes off to catch his train, bus or tram, is simply asking for trouble—and he usually gets it in the form of indigestion, or palpitation of the heart.

The same man goes on holiday, and comes back feeling more fit than when he went, and thinks it is the sea air which has done him good. It is, of course, nothing of the kind. The fact that he has had his meals in peace without the need to hurry out immediately has made all the difference.

People with this and many other complaints—mainly the fruit of imagination—are constantly buying medicine to cure them of the results of their bad habits. I am prepared to say that seventy-five per cent. or more of them could prevent ill-health by special exercise, taking up a few minutes each day, and that they, no more than the majority of people could, winter and summer alike, keep themselves as fit as the proverbial fiddle.

We are apt to think ourselves as enigmas that only chemists and surgeons can understand; but, really, the human body can be kept fit with the exercise of a little judgment and thought. There are thousands of people who have acquired injurious habits—or, at least, habits which are not conducive to good health and fitness—and though they recognise this, they make no attempt to save themselves from the danger of becoming "seedy."

They carry on in the old, bad way, waiting for something to happen, until their constitution revolts against this neglect; and they go under with some complaint—and when Nature finds that we are disregarding her laws, she jolts us rather badly at times.

With regard to what I have said about strenuous holidays, I would like to add that, to a thoroughly healthy person, the extra exercise obtained while on vacation has no ill effect.

Having, perhaps, been used to a certain amount of exercise each day, whether it comes within the scope of his work, or whether he has practised any movements to keep his constitution up to concert-pitch, the additional exertion would but produce a healthy tiredness, which we should all experience at the proper times.

Games such as lawn-tennis are helpful in keeping a person active, but there are many for whom they are altogether too strenuous—young people as well as those who are "getting on," and, so in almost every instance, we come back to the few minutes' exercise each day.

CAN MOUNT EVEREST BE CLIMBED WITHOUT ARTIFICIAL OXYGEN?

HOW TO TRAIN THE LUNGS FOR SUCH A FEAT

(Reprinted from "*Health and Strength*" of November 4th, 1922)

I have read with much interest about the recent meeting of the Royal Geographical Society and the Alpine Club, where Mr. G. L. Mallory spoke of the difficulties of breathing while attempting to sustain a fair walking speed in the thin Mount Everest air at 27,000 to 29,000 feet.

I think Mr. Mallory is quite right in preferring natural breathing to oxygen, but it must be full and correct breathing, not the sort of "deep breathing" taught in schools, to the military, and so forth.

I am afraid that Europeans could not get sufficient air simply because they never learned to breathe properly during unusual exertion, whereas the native porters knew it by instinct and practical training, and the elastic movements of their thorax were probably less hampered by their clothes.

FALSE TEACHINGS

When I say that the Europeans have not had it taught them I could even use stronger expressions—viz. that they have been again and again warned against deep breathing during exertion,

and that the "deep breathing" they are taught to indulge in when first the action of heart and lungs has been quietened is not only useless but sometimes harmful to certain vital organs. In my book on "Breathing" (1914, revised 1928) I proved that all the text-books of physiology used at the universities were wrong in their teaching on this question, especially in that they pay no attention to the vertical expansion in the upward direction during inspiration, and in deep expiration they recommend in-drawing of the abdominal wall. I have since had the opportunity of demonstrating my opinions practically to several prominent scientists and physiologists, who admit they are correct. (I may, for instance, name Professor Leonard Hill, M.D., F.R.S.).

WHEN TO BREATHE DEEPLY

That teachers of physical training in the schools are warned against the use of deep breathing during and immediately after exertion can be ascertained from any "Swedish" Drill manual. In the latest "Syllabus of Physical Training for Schools," reprinted 1921 by the Board of Education, will be found (Page 9) the statement that respiratory movements should not be attempted while the children are actually "out of breath"; and again (Page 64), "Deep breathing should never be given immediately after vigorous exercise." It is impossible for me to imagine a stronger proof than this sentence of the fact that the authors of such manuals, and all those who teach according to such doctrines, do not realise what deep breathing actually is.

In contrast to these statements it is my experience of more than fifty years that the time when deep breathing is most necessary and most beneficial is during and just immediately after vigorous exercises. Otherwise the stamina will suffer and the heart be easily damaged.

If all schoolboys and athletes had been taught correct respiration during protracted efforts the summit of Mount Everest might have been reached long ago.

THE IMPORTANCE OF FULL BUT QUICK BREATHING FOR AIRMEN

During the war (May, 1918) I wrote a letter to a flying officer who had asked my advice as to how to get sufficient change of air in the lungs at great altitudes. Let me quote here a few sentences of my reply. "The individual must have lungs, heart, and blood-vessels strong enough and sufficiently trained to be capable of hard work for protracted periods. Thus, to get the proper change of air sitting quietly in high altitudes (over 23,000 feet) the airman must probably breathe as powerfully as if running at a speed of twelve miles an hour on the ground. Doing this, the average athlete will have the mouth open and breathe rather shortly and quickly. Such a method is not so immediately harmful down upon the ground as it would be at great altitudes, where the air is always very cold, so that the lungs will be hurt if mouth inhalation is used, and the mucous membrane of the nose will freeze if the cold air is constantly inhaled through the nose and the warm exhaled air blown out through the mouth.

"The problem, then, is to get the greatest amount of air to and from the lungs through the nose in the shortest possible time and with the least strain. The lungs must, of course, be used to their utmost; it is wrong to take short and quick breaths, but also wrong to take long, deep, slow breaths; they should be full or deep, and yet quick. The ribs, being used as a pair of bellows, with all the breathing muscles working correctly, big quantities of air can then be quickly changed if the nostrils are well distended and not almost closing in their efforts to act like a noisy sucking pump."

Extracts from this letter were distributed by the Air Ministry on 13th October, 1918 (Circular No. 22,936). But I am afraid my theoretical advice was not quite understood in practice. I have since then seen several R.A.F. officers who had no idea of correct breathing, and who therefore had hurt their hearts or their digestive organs.

FEW PEOPLE THINK ABOUT THE BEST WAY TO BREATHE

As a matter of fact, of the 9,000 persons (amongst these many scientists, doctors, officers, and athletes) I have examined

during my twelve years' stay in London perhaps not more than one per cent. did use their respirating machinery correctly during ordinary steady movement, while I never found a single individual who understood how to apply this correct method when the need of change of air was extraordinarily great—i.e. during particularly vigorous efforts.

During the first lesson I always ask the pupil if he can tell me how he breathes when performing his usual exercise (tennis, golf, sculling, or just walking). Speed swimmers excepted, the common answer is: "I really don't know: I never thought about it."

AMAZING STATEMENTS BY SCIENTISTS

It is estimated by the famous physiologist, Professor Zuntz, that an adult breathes 16 to 18 times per minute when resting, and he adds that during severe exertion this number of respirations is multiplied several times: during ordinary walking two to four times, while cycling, mountaineering, and running, nine to thirteen times.

Let us consider for a moment the number of breaths stated to be required for mountaineering, 9×16 to 13×18 —i.e. from 144 to 234 per minute! Such breaths are naturally very short and shallow, but (putting aside the harmful effect to the heart in the long run), the individual may after all in this way get sufficient air when staying at low altitudes. But what will happen if in three times thinner air he retains this bad habit of shallow breathing? He does not understand how to move the thorax to get the triple amount of air in and out in the same space of time; and to take three times as many breaths—i.e. from 432 to 702 per minute is physically impossible. The result is—collapse.

HOW TO GET THE RIGHT HABIT

Now, when applying the method of full natural breathing which I use in my "Daily Five Minutes' System" of ten compound exercises during sixty respirations for fit persons to keep fit, any individual of average health will acquire the habit of requiring only 12 breaths per minute even during all sorts of

strenuous or quick movements, and it is possible by special training for a good athlete to breathe still more fully during exertion—say, ten times per minute, or even less.

When he then encounters three times thinner air he need make only 30 full respirations per minute, which can be done with powerful and well-controlled breathing muscles.

MY PERSONAL EXPERIENCE.

It is true I have not myself been to the altitude of 27,000 feet, but I have had the experience of living for three years in the Alps. I have done much ski-ing at 9,000 feet and rowed several races at 6,000. I did not feel the slightest difficulty, whereas the other fellows, who were all more than twenty years younger, went "out of breath" as soon as they rowed hard. It was easy for me to pull the boat round, not because I was stronger than the others, but simply because I had studied the breathing question. At 12,000 feet, when carrying another man on the shoulders or when wrestling, my much more muscular companions were the stronger at the start, but collapsed very soon owing to lack of "wind."

I am actually myself (over 63 years of age) able, by only breathing eight times per minute to perform during the above-mentioned 60 respirations, 36 neck movements, 286 arm, 362 leg, 12 wrist, 26 ankle, 28 finger, and 268 various trunk movements.

This number of trunk movements (very important, but for ordinary people more strenuous than quick running), is 12 times greater than the number performed in a 30-minute lesson of Swedish Drill!

I shall be very pleased to demonstrate such a performance to any member of a forthcoming new expedition to Mount Everest. I do not ask for any other reward than that he makes a trial himself, and if he finds the method a good one, adopts it when training and uses it in climbing the big "old thing."

PRESENT METHODS OF PHYSICAL TRAINING IN SCHOOLS RESPONSIBLE FOR TUBERCULOSIS.

The false Swedish principles of physical education are *directly* responsible for the widespread plague of tuberculosis.

because these principles do not allow real deep breathing. And *indirectly*, too, because being authorised and still strictly maintained by the Board of Education, they prevent the children from being taught real and sound ways of deep breathing.

Earlier in this chapter I showed that the lack of proper instruction to schoolboys and athletes in respiration during efforts was one of the causes why the summit of Mount Everest had not been reached (by the way, the man who got nearest the summit without the aid of artificial oxygen is now training his lungs after my method).

We may say that the Mount Everest failure was a pity, but, after all, it does not affect the happiness and lives of the great masses of the population. However, this is just what tuberculosis does. So if the false physical education in the schools be the ground cause of this scourge—a state of affairs which I now intend to prove at present existing—this indictment is certainly a very grave one.

I. Many cases of tuberculosis in the first stage have been cured by my exercises combined with real deep breathing. Among guarantors of this statement being Professor Leonard Hill and Dr. D. R. Mekta.

II. As is well known it is easier to prevent an ailment than to cure it.

III. In schools children are warned against deep breathing when it is most needed. Besides, the “breathing exercises” described and performed sporadically a few times during a whole lesson of drill are only movements with the arms, head or ankles, and have nothing to do with real deep breathing.

IV. Ergo, the school is responsible for tuberculosis not being prevented amongst the children, or cured during its critical stage.

It would interest me very much if anybody can show a “flaw” in my present contention.

A FAKED POLITICAL QUESTION.

In some countries Labour Parties have made political capital out of the tuberculosis question by maintaining the causes of this plague were insufficient food and bad housing. But if this be

true there would not be so many cases of tuberculosis amongst Royal Families, the nobility, and the moneyed aristocracy as are found at present.

The cause is wrong use of the lungs. Not only is tuberculosis caused hereby, but also many other ailments, so frequent amongst school children, ailments of the stomach and all the intestines of the abdominal cavity, all owing to the lack of internal movement and massage—which otherwise came quite naturally when the lower ribs and the diaphragm are moved to the very limits during real deep breathing.

A NATURAL HABIT

The deep breathing I advocate in my books is just the most natural way in which the greatest change of air can be maintained with the least strain, even during severe exercise and athletics. It soon grows into a habit, so that it goes on uninterrupted quite automatically, always functioning subconsciously, as long as the individual has a move on in any sort of exercise whatever—and a short time thereafter too until the heart's beat is normal.

OFFICIAL BUT FAKED EXERCISES

Whereas, as already hinted, the "Breathing Exercises" of the common obligatory school drill are absolutely artificial, and during drill only intended to be sparsely used.

Moreover, in the description of these "Breathing Exercises," it is never explained how the thorax itself—the main thing, of course—is to be moved; but only how the arms, the chin, and the heels are raised and lowered!

And the rhythm of these arm movements, etc., is ordered to follow the time of a respiration which has been accelerated by the foregoing muscular efforts, in other words the badly controlled short respiration so characteristic in persons who never studied or practically tried how to control their breathing muscles.

COQUETRY IN THE BREATHING LINE

These officially recommended "Breathing Exercises" are only a sort of coquetry with shortness of breath!

I, therefore, maintain that the "authorities" of the physical

school education do not know what deep breathing really is. They lack practical knowledge of how to establish an effectual control of the breathing mechanism as soon as somewhat greater activity is demanded of it.

To take 24 or 30 respirations per minute is very easy, but to make them absolutely complete, changing by each breath at least 5,000 cubic centimetres of air (the amount necessary when climbing near the summit of Mount Everest) demands some practice and a ready control of the main breathing muscles.

The matter is absolutely hopeless for the individual who does not understand how to relax his abdominal wall or who protrudes the chest instead of moving it concertina-like three or four inches straight up and down.

CHAPTER V

SOME GENERAL FACTS ON BREATHING

The correct respiration being the most important part of every single one of all my exercises, I will now—before going to describe these—give some very important hints about how to breathe properly. If my explanations contain some repetitions, they are only those which are intentional and such as are always allowed in conveying important advice.

WHAT CONSTITUTES A RESPIRATION:

One inhalation or inspiration, and one exhalation or expiration, constitutes one breath, or respiration. Inhalation and exhalation will always follow alternately upon each other in a definite space of time, and on the greater or shorter duration of these periods depends what we call the measure of rhythm or respiration. When the individual is in a state of rest, there is no need for any great change of air in the lungs, and it will then be sufficient to take comparatively small or incomplete respirations in slow measure. But as soon as the individual begins to move or work, much more air is needed, and the more the effort is augmented the greater will become the necessity of supplying the lungs abundantly with fresh air, and of getting rid of the vitiated air, since all the chemical processes involved grow intensive to a degree corresponding with the physical effort. The individual is thus forced to take as complete breaths as possible, and these in much quicker measure. If, now he is unable to expand and contract the thorax and lungs sufficiently to enable the requisite change of air to take place, he will get "out of breath," succumb to the effort, and, if these conditions are long sustained, the vital organs will be injured. It is, then, very important for every human being, even for persons of sedentary life, to develop and maintain the elasticity of the respiratory organs, because nobody knows when the moment may arrive when great exertion may be demanded of these

organs. Unfortunately many people cannot take what I call a complete breath. Either they do not know how to do it, or they may be physically unable to do it. In the first case it is easily acquired after a little steady and sustained practice, whilst in the latter case it will, of course, take a much longer time to develop the working power of the breathing organs. Still, it is always possible to do this, except in cases of advanced tuberculosis or very old-standing emphysema.

HOW TO EXPAND AND CONTRACT THE THORAX TO ITS FULLEST EXTENT:

The thoracic cavity can be widened during inhalation, and, of course, again narrowed, during exhalation, in three diameters, or in six different directions. There is vertical expansion both upwards and downwards, and horizontal expansion in four directions, namely, to the left and right sides, to the front and backwards.

The thoracic cavity is increased upwards, the collar bones, the shoulders and the ribs being lifted. At the same time the diaphragm is considerably depressed, the result being a downward increase of the thoracic cavity. The transverse or lateral expansion to both sides, right and left, is greatest in the region of the lower ribs, because these are much more movable than the upper ones.

When the ribs are raised and moved outwards sideways, they, together with the breastbone (sternum) are simultaneously brought somewhat forward. This constitutes the expansion of the thorax to the front. The work of moving the ribs is performed mainly by several small muscles placed upon, between, and inside the ribs (intercostal muscles and serratus major). The large breast muscles, or pectorals, do not share at all in the work of breathing; on the contrary, if overdeveloped, e.g. by exercise on the parallel bars, they will tend to check the elasticity of the thorax. It is, therefore, from the point of view of breathing, foolish to attempt to build up a chest of muscle instead of enlarging the cavity and increasing the elasticity of the lungs.

Finally, we have the horizontal backward expansion, forming the sixth direction in which an enlargement of the thoracic

cavity is possible. It is performed by a backward movement of the whole upper and middle part of the spine.

The thoracic cavity is again diminished, and exhalation thus performed, when the chest contracts all over, and the diaphragm ascends. The lowering of the shoulders and collar bones is caused simply by their own weight, whilst the downward and inward movement of the ribs, sternum and spine, in ordinary breathing, is caused partly by the weight of the bones and partly by the elasticity of the whole thorax, when the inspiration muscles relax. But when deep breathing is concerned, the ribs should, by definite muscular force, be pressed further downwards and inwards. Some authors maintain that the horizontal, lateral expansion alone gives the best result, others assert that this is attained only by the diaphragmatic movements. In order to prove their theories, these authors point out that the lower lobes of the lungs are larger than the upper lobes. Again, there are others who try to convince us that the antero-posterior expansions are of greater value than the lateral. And, finally, there are some who claim just the same for the vertical expansion of the collar-bone region, even going so far as to declare that the thorough practice of this movement would result in the complete prevention of the tuberculosis plague.

The whole argument is not of much value, because the fact remains that absolutely none of the various expansions can be dispensed with if complete respiration is to be performed. On the other hand, it may be of some interest to institute a comparison. I would, therefore, point out that vertical expansion will, in a well-developed male, extend to about 3 inches upwards and 2 inches downwards, five in all; and horizontal lateral expansion would be about 2 inches to each side, whilst antero-posterior expansion will very seldom amount to more than $1\frac{1}{2}$ inches in all. The backward movement of the spine will always be small, seldom more than $\frac{1}{4}$ inch.

IS IT EVER REASONABLE TO PERFORM AN INCOMPLETE BREATH?

It seems quite obvious that for the healthy-working human being, especially for athletes, sportsmen and singers, the only sensible thing would be to employ the whole capacity of the

lungs when performing. Nevertheless, it is a fact, although incomprehensible, that so many authors of booklets on breathing and singing advocate the use of one single part only, or of a few parts, of the respiratory mechanism, simultaneously severely condemning the use of all the rest.

It is only in the case of defects or ailments of the chest that certain parts of the lungs should be favoured, either with a view to developing such defective parts, or because it would be dangerous to use any part of the lungs that may have been injured.

It is true that an incomplete breath is sufficient when one is sleeping, or when sitting bent over the writing-desk, or when reading in an easy chair, because in such cases the need for air, or rather of change of gases, is only very small. But as soon as one moves, more air is immediately needed, and it will then be of advantage to employ the entire thorax. And if this has grown rigid and immovable, so much the worse for its possessor. A German armchair philosopher has found that of 490 cubic centimetres of air inhaled, only 170 are due to the movement of the diaphragm and 320 to the expansion of the chest. I should think it must have been his own defective respiratory faculty which he measured, because I am sure that the above-mentioned proportion in a well-developed athlete or oarsman, who can inhale 6,000 cubic centimetres, would be a still stronger argument for thoracic expansion. It was formerly a common view that the abdominal form of breathing was the natural one for men, the upper chest form for women. But this view is quite erroneous and only caused by bad habit. When the lower ribs and the whole abdomen are laced immovably in a corset, the woman is, of course, compelled to restrict herself to the employment of the upper chest method alone. And it is for the purpose of repairing the harm done by such old habits that special exercise of "abdominal" breathing is most valuable for ladies.

We speak popularly, when performing this special breathing, of filling the "stomach" or the abdomen with air; but the air will, of course, only fill up the lower lobes of the lungs, as a result of the thoracic cavity having been enlarged downwards by the descent of the diaphragm. What actually in this

case causes the protrusion of the abdomen is, of course, the descent of the viscera, which are allowed to sink down and forwards inside the distended abdominal wall. And this lowering of the viscera will facilitate the descent of the diaphragm, thereby making this "abdominal" breath fuller. During the corresponding exhalation, the abdominal wall is drawn inwards as much as possible, and the intestines are again pressed inwards and upwards, whereby the now relaxed diaphragm is assisted in its ascent.

Another example of a reasonable incomplete breath is seen when boxers are infighting. Almost the whole costal part of the breathing is in this case checked, because the breast-bone and the ribs, especially the lower ones, are fixed by the braced abdominal muscles. Breathing in this case must be carried on mainly by the aid of the vertical movements of the clavicular region and of the diaphragm. Again, gymnasts who climb ropes by the hands only, or perform hanging tricks on the trapeze, the Roman rings, or horizontal bar, are dependent on this special method of respiration, if they breathe at all during the performance. But in most cases they will be found holding their breath, thereby endangering their vital organs. Also when we spend our time in crowded halls in poisonous air, or are forced to stay in badly ventilated rooms, it is wise to use an incomplete breath, thus respiring as superficially and lightly as possible. Thus we inhale only the smallest possible amount of poisons into our bodies. As soon as we come outside into the open air, we should, of course, compensate by breathing very fully.

Physical exercise performed in foul air is worse than no exercise at all, because we inhale about sixteen times more air and, of course, poisons in proportion, when exercising than when resting.

When we breathe very quietly—for instance, when resting or sleeping—the diaphragm "pulsates" on its own account, and that quite unconsciously, in a manner similar to the beating of the heart. In this case the slight contractions and relaxations of the diaphragm form, in many male individuals, almost the only motive power of their breathing. In women, healthy children and athletes, in other words, in persons with an

elastic thorax and well-trained breathing muscles between the ribs and round the collar bones these muscles will continue their work subconsciously during sleep and rest, but naturally, not very conspicuously, owing to the decreased need of aeration of the lungs.

But when more change of air is needed, the whole of the thorax expands and contracts, moved by muscles which, in well developed individuals, are much stronger than the diaphragm. Even if it still continue its own small "pulsations," the diaphragm is now, as a whole, forced to give way to the movements of the lower ribs and sternum, to which it is attached. It will be easily understood that, when the ribs are brought nearer to each other, the whole middle part of the diaphragm will move upwards; and when the ribs are moved away from each other, this central portion of the diaphragm will sink, even though the ribs are at the same time somewhat raised. It is only the outer annular order or margin of the diaphragm which is brought into a nearly vertical position when the ribs are contracted, and into an almost horizontal position when the ribs are expanded and raised, whilst the central part, including the domes, will move up and down without materially altering its shape.

I think there exists a good deal of superstition about the diaphragm, this mysterious organ, which, nevertheless, every man in the street, in his own fancy, knows just as well as his pocket.

I am convinced that it is quite impossible to move the diaphragm separately, intentionally or voluntarily, although, of course, we move it indirectly by moving the ribs or the abdominal muscles. The diaphragm cannot be perceived through any of our senses, and I, therefore, maintain it is impossible to establish direct nervous contact with it. I know that many people will assert that certain abdominal movements are caused by the diaphragm; but it is impossible to explain how the diaphragm can achieve such results. And there is surely no reason why the diaphragm should perform a thing which is easily done by the abdominal muscles.

All the sensations which people imagine they have in the diaphragm are always actually in the abdominal wall, or perhaps

in the stomach or intestines. If you ask a person to point out where he thinks his diaphragm is, he will, in nine cases out of ten, put his finger near the navel, or at all events not higher than on a level with the opening of the lower pockets of his waistcoat. But the diaphragm is really situated much higher on the front of the chest, above the point of the breastbone, that is, on a level with the upper pockets of the waistcoat.

THE EVILS OF SHORT AND SHALLOW BREATHING:

In superficial and short respiration one portion of the lungs is used too much, and may thereby be overstrained, whilst another part, through disuse, loses by degrees its working capacity. The destructive effects of short respiration are not limited to the lungs alone. They affect the digestion and metabolism, the whole circulation, and, what is worst of all, the heart. It is a well-known fact that the need for air is increased by hard physical work or exertion. It is, therefore, obvious that the breathings, if short, must be more rapid and more frequent in order to secure a sufficient supply of air. Scientists reckon that the heart has a tendency to beat four times to each respiration. If, then, the respirations of a badly trained athlete reach the number, say, of 140 per minute—which is not unusual—this may mean that the heart requires to beat 560 times! But this is an impossibility, and the result will then be a very irregular pulsation of the heart, the one beat stumbling “on the heels” of the other, and violent palpitations. Such an overstrained heart could never last long.

There are certain authors of physical culture books who are professionally jealous because I have been the first to prove scientifically the value of deep respirations *during exercise*. These authors maintain there is no need of breathing deeply in order to insure that all parts of the lungs are in activity: the pressure is the same everywhere in the lungs so that the air will be divided evenly to all parts.

This is quite right in theory, and in cases where the whole thorax is perfectly developed and all the breathing muscles under complete control may be practically correct, but perhaps not one person out of every thousand possesses such perfect control.

Most people are deficient in one or more places. If the thorax is not expanded in any one place, only a smaller portion of air will penetrate here, because the air follows the line of least resistance. It would, therefore, be just as foolish to maintain that the air will penetrate evenly to all parts of a football, even if we place a heavy piece of cast iron upon a part of it before it is inflated.

Even if these authors were right in maintaining that shallow breathing will not in the long run do any harm to the lungs and heart, they have quite forgotten how dangerous such imperfect use of the respiratory machinery is to the work of all the digestive organs, which miss most of the internal massage if the thorax or diaphragm be not moved to their utmost extent when breathing during exercise. In many cases the bad effects upon heart and lungs do not show until advanced years; whereas, the digestive organs and the processes of metabolism are often seriously affected already in youth.

DEEP BREATHING MUST BE TAUGHT:

We cannot teach animals to breathe deeply, but we can teach the child to do so, little by little, and even the adult human being. Then by degrees it will become natural to the person to take fuller respirations. Such education in breathing means increased strength and vitality of all parts of the body, internal and external, and, consequently a fuller and better and longer life, which is the aim of all so-called deep-breathing exercises. In my first book, "My System, 15 Minutes' Work a Day for Health's Sake," I conclude the chapter, "*For Those Devoted to Athletic Sports*," with the following remarks: "Many sportsmen also upset their hearts because they take no care to breathe properly. At the Olympic Games of 1906, it appeared that nearly all the participants, excepting the Americans, suffered from dilatation or other defects of the heart. Those who carry out my System according to directions will acquire the good habit of inhaling and exhaling deeply during the exercises as well as immediately after them. The reason why I have been able to take part, for a whole generation, in many and various hard and often protracted contests, without inflict-

ing the slightest injury upon my heart, is because I have always from childhood paid strict attention to correct respiration."

During recent years severely adverse criticisms of the manner in which the modern Olympic Games are being conducted have frequently appeared in newspapers in all parts of the world. One of the most serious objections is that the aim of them is to produce specialists who, being splendidly developed in one direction or in some particular part of the body, lack that harmony of all-round development which is so essential to health and long life.

Under present conditions, thousands of athletes, training for these Games, are injuring their vital organs, especially the heart, because they indulge in strenuous one-sided exercises without possessing a body which has been uniformly strengthened within and without by proper physical education in accordance with sound hygienic principles. To insist on an age limit for competitors is, of course, a very paltry device which relieves the controllers of the Games of a good deal of responsibility. But such a course will not obviate failure, because athletes who are too young to enter will simply continue their erroneous methods of training, meanwhile entering for other competitions until old enough to participate in the Olympic Games. Besides which, the age limit involves great injustice to youngsters educated and trained in accordance with sound principles, and who are, therefore, fully capable of competing with any adult.

The only sensible measure would be to encourage the healthy all-round development of all children, young people and aspiring athletes, the aim of which development would be above all to invigorate the vital organs in the thoracic and abdominal cavities, further to develop the trunk muscles before paying too much attention to the arm and leg muscles, and to transform the skin into a hardened, properly functioning organ.

And the only way possible to attain such hygienic development is by means of individual daily physical gymnastics, the best way to encourage which would be to include in the Olympic Games' programme a competition for practical systems of so-called home gymnastics.

Now that there are indications that the Swedish authorities are no longer to be called upon to determine what kind of

gymnastics are to be competed for, or demonstrated at the Games, realisation of this hygienic proposal is within the range of possibility, in which event there would be a cessation of carping from those critics who recognise that all-round hygienic development ought to be the basis of all games and sports, and is, therefore, much more important than many of the strange competitions which now disfigure the programme of the Games, the only drawback being that the compiler of the winning system of "home gymnastics" would probably win such fame and wealth as to excite envy.

HOW THE AVERAGE ATHLETE STRAINS HEART AND LUNGS:

It is estimated by Professor Zuntz that an adult man respires 16 to 18 times per minute. It is also asserted that the average number of pulsations of the heart should be 64 to 72 for a man in a state of rest (viz., 4 by 16 to 4 by 18). But this German professor proceeds to state that during severe exertion this number of respirations is multiplied several times, during ordinary walking, 2 to 4 times; while cycling, mountaineering, and running, 9 to 13 times; and while rowing the course at racing speed ($1\frac{1}{4}$ miles in 8 minutes), 20 times. I have seen much faulty breathing amongst athletes generally; but if this statement of Professor Zuntz is according to fact, it is much worse than I ever dreamt of. Twenty times 16 is 320 respirations per minute. And this again means that the heart strives to attain 1,280 pulsations per minute! What wonder that so many promising athletes have ruined their heart and their health?

I am now (1924) over fifty-seven years old, and have taken part in rowing regattas for thirty-seven years, but hitherto I have never met an oarsman who could pull harder than myself. The reason is that from an early age I cultivated a full, and proportionately slow, regular respiration, even during the hardest and most protracted efforts. As long as I am under 28 strokes per minute, I take two breaths to each stroke (if racing, of course; during paddling, never more than one breath). But if I make over 28 strokes, I only take one breath per stroke. Therefore, the highest number of respirations per minute will

'be 56. This is vastly different from 820! And the pulsations of my heart, which, according to theory, should strive to reach the number of 224, will practically never be more than 180 even in the hardest spurts. (This number does not, of course, represent a whole minute's work but, there being 30 beats in the first ten seconds after the finish of a spurt, this corresponds to 180 per minute. A sound heart will rapidly regain normal beat, pulsating at the end of the first 60 seconds at a rate of, say, 160 beats per minute, and at the end of the second minute even only 120.)

The German doctor, Professor Kolb, himself at one time a prominent oarsman, found the heart of the rowing athlete to beat 230 to 250 times per minute after only one minute's hard work. This rate is not so alarming as Professor Zuntz's theoretical figures would lead us to anticipate. Above the limit of health, it can only be assumed that the respiration of these men was too rapid and shallow.

It may be useful to discuss this matter a little further. The effects upon the lungs and heart of the various forms of bodily exercise, gymnastics, games and sports are very different. We can, in respect to these effects, distinguish between two large groups, viz. momentary, concentrated feats of strength (or of quickness), and, on the other hand, prolonged feats of strength performed in a regular measure (endurance). The first group are scarcely able to strengthen or develop the heart and lungs, and only by careful training will it be possible to avoid positive harm being done to these organs. But the second group may easily serve to develop and strengthen both heart and lungs, and only by very irrational proceeding will it be possible to do harm to the organs. This is the great difference between these two groups. Some of the worst examples of the first group are: lifting of heavy weights, difficult exercises on the Roman rings, trapeze, parallel bar, etc., short and strenuous wrestling bouts; but 100-yard sprints, several passages in football, hockey and lawn tennis, and the newer methods of short-distance swimming also belong more or less to this group. Good examples of the other are: rowing and sculling, long-distance running and walking, skating and ski-ing, the older methods of swimming and all well-measured gymnastic exercises with regular

breathing. Some sports, e.g. boxing and cycling, it is difficult to classify positively in the one or the other group. It depends upon the individual manner of working. And several other sports are doubtful—that is, they are scarcely calculated either to develop or hurt the internal organs to a degree worth mentioning. Throwing and putting weights, jumping, golf and cricket belong, I think, to this category.

The reason why the first-mentioned group is so calculated to injure the organs is as follows: When the lifting of a very heavy weight—or other feat approaching the limit of the individual's power—is to be performed, it is necessary to brace most of the muscles of the trunk, in order that the limbs (for instance, the arms which lift the heavy weight) may have a solid support. But during this stiffening of the trunk almost everybody will hold the breath after having taken a full inhalation. The heart will beat very quickly, because the effort of lifting will be so great. But it will receive less and less oxidised blood, because the lungs will have stopped their work when the breath is retained. The congested red face and the swelling of the neck show how the venous system has been overfilled.

When at last the effort is over, and the air is expelled from the lungs, the blood will rush suddenly into the auricles and ventricles and overdilate the weak walls, especially on the right side, where they are thinnest. And, if often repeated, this acute dilatation of the heart may become chronic.

This bad form of enlargement of the heart should not be confounded with that sort of enlargement which arises when the muscles of the heart, or the walls themselves, are made thicker, stronger, and more elastic, as is the case when proper feats of endurance and other good games are performed in a sensible manner.

Some doctors would call such a strong and big heart "hypertrophied." But this name ought not to be used to signify that the heart in question is diseased. It is, on the contrary, the strong and big heart of the athlete, which is of the right sort, even if it is more seldom seen by doctors than the so-called "normal" heart of ordinary weak people. I hope my readers will now understand that it is quite wrong to call a

weak or diseased heart an "athlete's heart." Even if the heart has been weakened by athletics badly performed, it is wrong to call it an "athlete's heart," because a man ceases to be an athlete the moment his organs are weak. Nevertheless, we often see this error in the daily papers. A paragraph such as the following is typical: "A doctor stated at the inquest to-day concerning the sudden death of a naval cadet, N. N., that he had an athlete's heart. After taking part in Swedish drill he collapsed. The parents of N. N. live at Y, and he has rowed in races for St. Z's School, where he had good health." This example also proves that Swedish drill is not capable of curing and strengthening a weak heart, such as often has been the case with "My System." Even if this young naval cadet had formerly weakened his heart by rowing without paying attention to his breathing, it could have been strengthened by sensible free exercises, combined with correct deep breathing—and his life would then have been spared.

Any sort of calisthenics and drill where the aim is homogeneity and simultaneousness of the movements is, moreover, everything but adequate for strengthening heart and lungs. Such drill can, and even must, be harmful to these organs when they are weak. The reason is that it is not possible for the individual to breathe exactly in the manner and measure most natural and convenient to him. This fact is very obvious in cases where small boys are drilled together with bigger boys.

There will, naturally, be an aggravation of the evil if the ultimate aim of the drill—as that of the Swedish, for instance—be to maintain an exaggerated stiff carriage with arched chest and indrawn abdomen throughout the whole performance. This sort of calisthenics, which has hitherto been deemed by the public at large and, unfortunately by most "authorities" as well, as excellent in every respect, may in reality prove harmful to the vital organs of individuals who are not over strong.

My exercises have already been introduced into many schools as morning calisthenics for health. When my exercises are thus performed by several children at the same time, I always warn teachers against borrowing from their lessons on drill that rule which insists on the strict simultaneousness of every detailed movements. Such simultaneousness may be excellent for pro-

ducing discipline, attentiveness and other splendid virtues, but is of no use for promoting health; and is, moreover, directly dangerous for children whose vital organs are not yet sufficiently strong and developed.

WHY DEEP-BREATHING EXERCISES HAVE LATTERLY FALLEN INTO DISCREDIT:

The question of the usefulness or the harmfulness of deep-breathing exercises has of late been keenly discussed, even in the daily papers. It is very likely that the opponents of such exercises have had discouraging experiences themselves, or have witnessed very poor results amongst their friends. I have myself now and then met people whose chests or lungs were defective, notwithstanding that they had worked hard for the purpose of strengthening these important organs of the body. But one thing is quite certain: when deep-breathing exercises have given bad results, then the method has been a wrong one. There are three classes of people amongst whom we may be sure of meeting the inelastic "cropper chest," veiling an incipient or already developed emphysema or even heart disease. Let me cite the case of the Swedish gymnasts, the victims of military drill; and the so-called "strong men."

One of the most common regulations for soldiers is: Chest outwards, "stomach" inwards!—the tight belt, or the officer's corset, help him considerably to secure this unnatural posture. Soldiers drilled, they are exhorted to arch the chest more and more, and to keep this up permanently. That is called deep-breathing exercise! And the officers think it their duty to set the soldiers an example. They hardly dare to make a fair exhalation for fear the chest should sink. This foolish practice continued for years, the ribs become fixed and rigid, the vesicles slack and permanently distended, like old misused indiarubber; in other words, the lungs are ruined.

Here are illustrated two distinct faults: firstly, the strongly indrawn abdomen, as a result of which the viscera prevent the diaphragm from sinking and, therefore, the breath from being a full one; secondly, the lack of deep exhalation, the effect of which may be the above-named lung and heart troubles. It is, therefore, not only wrong, but in the long run also dangerous,

always to walk about with the chest too highly arched and abdomen too much drawn in. The natural easy bearing of the body seen in the ancient Greek statues is the healthiest and most beautiful—at all events in the opinion of those who have a properly developed taste. But I am sure that if a Swedish gymnastic teacher or a military drill sergeant were to visit the museum and contemplate, not from the front, but in profile, an Apoxyomenos, a Doryphoros, or an Apollo Belvedere, they would declare these superb figures round-backed and flat-chested.

Samples of the third class, the "strong men," are found among those who pose and are photographed in the most unnatural and overstrained attitudes. It becomes quite habitual to performers of "feats of strength" after inhalation to arch the chest and brace all muscles of the trunk, especially the abdominal, while they hold their breath. By degrees they become firm believers in the false theory that this is the right method of deep breathing, and that the highly inflated upper chest and the deeply indrawn abdomen are the very symbols of imposing, superhuman strength.

SHOULD THE BREATH EVER BE HELD AFTER A DEEP INHALATION?

There are books on "Deep Breathing" and "Breathing for Health," in which every single exercise is breath-holding, combined with some movements of the limbs. There may be cases where the holding of the breath for a minute or more might be a useful exercise calculated to strengthen the lungs and heart. Setting aside certain occasions of urgency (e.g. when diving and rescuing drowning persons), this should never be combined with feats of exertion, and can only be recommended to healthy and well-trained adults, whose vital organs are sound. To those who are suffering from consumption, asthma, and heart diseases, the practice is dangerous. And even overtrained athletes or muscle-bound weight-lifters who imagine themselves to be so strong and healthy, should, above all things, avoid holding the breath. It is this habit, combined with over-inflation of the lungs, which is responsible for emphysema and heart disease; hence the reason why I do not advocate any breath-holding

exercise. It must also be remembered that it is not only the action of the lungs and heart which is disturbed by holding the breath. What stimulates the stomach, liver, bowels, and intestines is just the internal massage produced by the movements of the lower ribs and the diaphragm, when full, deep, correct breathing is performed. The lack of such stimulus will soon cause stomach troubles and digestive disorders.

One of the most striking proofs of the importance of correct breathing, for the proper action of the organs situated below the diaphragm also, is my great number of cases of young military men who, notwithstanding their physical drill and athletic games, suffered from constipation and other digestive troubles, caused by the wrong habit of keeping the abdomen indrawn and rigid, and so, muscle-bound. As soon as they learned to relax the abdomen and to move the lower ribs freely in full respirations during exercise, the ailment disappeared. In some cases, even operations were thus prevented.

THE IMPORTANCE OF PHYSICAL EXERCISE IMMEDIATELY BEFORE DEEP BREATHING.

In scores of books of all languages deep breathing is recommended, and always prescribed in the same manner, namely, that in the early morning one should stand in front of an open window and perform a long series of very full respirations, more often than not combined with holding of the breath—but not with muscular exercise. Deep expiration is never mentioned.

Many years ago, in my first book, "My System," I maintained that it was a wrong idea to stand quietly and take deep breaths without any previous physical exertion. And all my considerable experience since that time has convinced me that I was right. It is always a healthy practice in daily life to take fairly deep and regular breaths, but the special full respirations, whereby large quantities of air are pumped into the lungs, should never be performed unless the body really needs this extra supply; otherwise derangement in the relative pressure of the vessels of the body will be caused, the equilibrium in the tissues will be disturbed, and giddiness and dizziness result. On the other hand, the deep breaths will be more complete, will be

performed more easily, and give more comfort, if combined with some form of bodily exercise or physical exertion requiring increased change of air in the lungs.

If such exercise only lasts a short time, we should utilise the opportunity and take some deep breaths immediately after it. If the exercise be of long duration, one could perform deep breathing continuously during the movements.

Beginners in the art of breathing unacquainted with gymnastic exercise, may profitably practise deep breathing when walking to or from their business. They should take 4 to 5 strides during inhalation and 5 to 7 during exhalation. After some practice the number of strides may be augmented. But there should always be some more strides during exhalation than during inhalation. The lungs stronger, it is an excellent plan to run a few hundred yards, and then walk and perform a number of breathings, which now will naturally be very full. Then repeat the run and the walk, with deep breathing, several times.

The reason why so many "inventors" of special deep-breathing exercises recommend holding the breath, sometimes for a rather long period, is to create a desire for more air. They realise that it is not easy to breathe very fully unless such need exists. But instead of producing this effect in a natural way, by good bodily exercise, they suggest holding the breath. It is undoubtedly true that one is forced to take several full respirations after having held the breath for a minute or more; but if one does not possess a strong heart to start with, the organ will certainly be injured.

THE IMPORTANCE OF COMPARATIVELY SLOW EXHALATION:

Full inhalation depends on deep exhalation, but the opposite relation does not exist. If one has taken a very long and deep exhalation, one is bound to follow this with a full inhalation; otherwise there results a sensation of being smothered. But after a full inhalation one experiences no special impulse to perform an exhalation of a corresponding quality or quantity. Hence the prime importance of exhaling. Many people cultivate an inadequate method of inhaling, a sort of constant inflation

of the lungs, with an exaggerated arching of the chest, which eventually may result in the production of emphysema. Full inhalation often comes quite naturally as the result of predisposing conditions, e.g. after muscular effort; but deep exhalation must be specifically learnt. A good deep exhalation demands a certain amount of time, and should, therefore, always be performed rather slowly. Reference to "My System" will show that I always recommend the practice of slow exhalation during the performance of the muscular and gymnastic exercises, and of the rubbing movements as well, even in cases where I sometimes prescribe a rather brisk inhalation. And I adhere, of course, to the same principle in this booklet. The scientific reason for such slow performance of exhalation is as follows: The walls of each of the four hundred millions of vesicles in the lungs are constructed of elastic fibres. But this elasticity will in time be lost if the fibres are expanded too much or too often *without giving them sufficient time to contract again*. This is exactly the case with ordinary indiarubber when it is misused. If the vesicles are always filled with air by full inhalations, and if they are never given sufficient time to contract and again expel the air by deep and slow exhalations, the result will be by degrees a morbid slackness of the fibres. When it is remembered that during deflation each of the several millions of vesicles of the lungs has to contract to about one-third of its capacity when distended, it will be readily understood that a proportionately considerable amount of time is requisite for the process. The reader may have met athletic-looking weight-lifters or gymnasts or "strong men" with chests as high, broad and arched as a barrel. Some may have admired or even coveted these barrels. But in most cases such chests are "whited sepulchres." The ribs have become practically immovable, and the vesicles of the lungs have lost their elasticity. Such a chest will be unable to stand a protracted effort without injuring the heart, and emphysema of the lungs itself will probably cause premature death of the individual. Therefore the ideal should be a movable thorax and elastic vesicles, trained just as much by steady contraction as by expansion.

WHY SHOULD WE BREATHE THROUGH THE NOSE?

Nature gave us a mouth with which to eat and to speak and a nose with which to breathe and to smell. We are told that "the breath of life was breathed into man's nostrils"—then why should he not continue to live by breathing through the same channels? Many human beings are degenerate and use their organs in a perverted way, e.g. the mouth for breathing purposes. If we examine the internal structure of the nose, we shall see at once that it was Nature's intention that inhaled air should pass through this channel. The entrance to the nostrils is furnished with hairs, and farther inwards, the nasal cavities are entirely lined with mucous membrane. Most of the dust, germs and impure particles which enter during the act of inhalation are retained here, and the air is thus cleansed, whereas if the air is inhaled through the mouth, the micro-organisms may pass into the lungs. Especially in cases where the tonsils have been removed by operation, the direct entrance to the bronchiæ and lungs is quite open. In large towns, where the air is always foul, the mucous membrane of the nose has a very hard task to perform, and must therefore secrete a plentiful supply of mucus, which will run or drip away from the nostrils. This process is therefore by no means always a sign of cold, but only proof that the protecting organs are performing their duty thoroughly. In some large towns the air is so bad and the smoke so dense, that it is impossible for the mucous membrane to arrest all the dust and germs, some of which will, therefore, pass through the throat and reach the bronchi; but if these organs are healthy, they will react against the invasion and throw off the germs, which are ejected with the phlegm in the act of expectoration. This sort of coughing also, is not at all due to any ailment or cold, but is actually a proof of the sound condition of the organs. On the other hand, unhealthy persons who are without reactive power will retain and store up, day by day, year by year, all this poisonous matter within their system, which becomes as a consequence steadily weakened. It is a good habit to cleanse the mucous membrane and the throat each morning and night with a solution of common salt in warm water. When the throat is gargled with this in the usual manner, much phlegm and black substance from the inhaled town air will be dissolved

and brought up. The nose is easily cleansed by means of some of the salt water held in the hollow of the hand, then snuffed up into the nose, and finally expelled through the mouth.

If persons who have decayed teeth inhale through the mouth they will never get fresh air into their lungs, even when visiting the seaside. The inhaled air will be constantly infected by the putrid secretions of the mouth. And when they exhale through the mouth, they will poison the air for their fellow beings.

Another advantage of nasal breathing is that we become immediately warned, through the sense of smell, of the presence in a room of poisonous gases, or of air which contains dangerous impurities, whilst those who breathe through the mouth, as a rule, have the nostrils obstructed and have impaired, or totally lost, their sense of smell. These people are quickly suffocated in the case of an escape of gas, or slowly poisoned if working at dangerous occupations, as in the case of compositors, painters, plumbers, pottery workers, etc., who are particularly liable to lead-poisoning. It is, especially in cold weather, of great importance, that the inhaled air should be well warmed before it enters the lungs. This heating cannot take place adequately unless the air is inhaled through the nose. Many chills and inflammation arise solely from the fact that the air inhaled through the mouth is too cold for the bronchi and the mucous membrane of the lungs. Now, the interior of the nose is splendidly arranged as a feed-heater. There are one small and two big pieces of muscle or cartilage in the inner cavity of the nose, and between these are three irregularly formed passages, the walls of which are entirely covered with mucous membrane filled with warm blood, which thus constitute a very large heating-surface. The air during inhalation is dispersed over this large surface, and the irregularity of the walls of the passages prevents it from rushing through too quickly. By this means even very cold air is heated to a temperature not much below that of the body. At the same time this inrush of fresh air forms a most effective massage for the mucous membrane. If it be deprived of this massage, as is the case with mouth-breathers, the membrane will denegerate and become the seat of chronic catarrh or of adenoids, a species of tumour or growth of the lymphatic tissues of the upper part of the throat, especially

prevalent in children. The presence of which condition may be detected by the fact that the child suffers from chronic nasal catarrh, and breathes through the mouth, which is usually held open. The obstruction and consequences give the child a stupid, sluggish look. Adenoids occur chiefly in children from four to fourteen years, but very young children have been known to suffer from them. Being morbid growths they are always due to ill-conditions of the mucous membrane, and that is why all children should be taught from infancy to breathe through the nose. This may be achieved by the mother taking care to close the baby's lips whenever it is asleep. The infant will soon acquire the habit and be benefited thereby.

The most effective cure for adenoids is that of surgical removal, and is in nearly all cases a very simple and not dangerous operation, often performed merely with the doctor's finger.

Besides which, the duty of the nasal mucous membrane is not only to heat the inhaled air, but also to moisten it, or saturate it with vapour. This process is also unsatisfactorily performed if the air makes a short cut through the mouth. The mucous of the nose, in the act of secreting the vapour, becomes transformed in dry weather into hard crusts. Therefore the air in rooms heated by radiators, etc., is often very uncomfortable. Flat basins of water should be placed on the top of such stoves, in order to supply the air with sufficient moisture.

There is still another great advantage in breathing through the nose, namely, that one obviates all the risks of making one's throat dry and husky by the continual friction of the air on the back of the throat. Especially in dry weather, or when the air is filled with dust, the mouth-breather will suffer from an almost unquenchable thirst. This produces a habit of excessive drinking—a practice which is liable to injure not alone the pocket, but also the health.

The reasons, then, for nasal breathing are many and weighty, and this method ought, therefore, to be adopted as much as possible. Moreover, there is also an aesthetic reason why we should breathe through the nose. Running about with an open mouth always imparts an idiotic appearance. In Denmark we say of such an individual, that "he resembles a codfish in rainy weather."

Many persons at first find it difficult to obtain sufficient air through the nose. Very often the reason is that they close the "wings" of the nostrils instead of distending them. They don't know that in order to get air into the lungs, it is sufficient simply to open the nose and expand the thorax, which, by creating a vacuum inside, will force the air to rush in. They imagine that the air must be sucked in, and that such sniffing should be performed with as big a noise as possible. But by this suction the wings of the nose, and the outer walls a little higher up as well, will be drawn inwards and pressed against the middle wall of the nose, and the nostrils be thus closed. The wings and outer walls of the nose consist of muscles, which should be trained so that they are able to move outwards and thereby give free and almost soundless passage to the air. Many persons nowadays have lost their ability to move these muscles. But after a few weeks' practice it is in most cases possible to regain this power. For persons who find it very difficult to acquire this control of the nostrils I recommend practice of it before a mirror every time they have a few minutes to spare.

WHY IS IT GENERALLY WRONG TO EXHALE THROUGH THE MOUTH AFTER NASAL INHALATION?

In a letter I received some time ago from an officer of the Navy I was asked why in "My System" I recommended both inhaling and exhaling through the nose. The writer thought I was wrong, and he stated further, that "the Swedish system as taught in the Navy tells those who practice it to inhale through the nose and exhale through the mouth." I have often been asked the same question by German readers, probably because so many German books on gymnastics recommend this wrong method. Lieutenant Hébert, the author of the new French "System," has also fallen into this error (see p. 127 of "L'éducation physique"), and into many other errors as well. Let me now, therefore, answer the question fully, for once and for all. Perhaps the most practical way to convince a man who follows this method that he is wrong would be to let him practise it during a hard ski-ing trip up and down the mountains, or when speed-skating a fair distance in a temperature of that sort in which the breath freezes and settles as rime on the beard and

eyebrows, and upon the front of the jacket. He would certainly feel as if that ornament of the face we call the nose were completely missing, as it would be frozen white both inside and outside; and if he did not quickly rub it with snow he would soon lose it in reality. The reason for this is, that the man, having steadily inhaled ice-cold air, would, at the same time, have lost all opportunity of again heating the frozen mucous membrane by the aid of warm exhaled air, since he had allowed it to escape through the mouth.

When the mucous membrane of the nose has become too cold, it is no longer able to heat the supply of cold air which is inhaled in the ensuing breath. Cold air will then enter down into the lungs and produce colds and perhaps pneumonia.

A similar danger may be incurred even during the summer, if the air is very dry. Not only the mucous membrane of the nose, but also that of the lungs, will then become too dry and irritated and no longer capable of resisting the attacking germs. The only means of preventing this is to allow the exhaled air, which is always saturated with vapour, to pass away through the nose instead of through the mouth.

There is still a third reason why exhaling through the mouth is wrong. If there are bacilli or other dangerous organisms in the air—and this is always the case in railway compartments, and even in the open air of big centres—many of these germs will be arrested at various stages by the mucous membrane. But if there is a regular, steady draught downwards, some of these bacilli or germs will, owing to the absence of an expiratory current, certainly travel farther and farther downwards. This will happen if inhalation is always made through the nose and exhalation through the mouth. But if there occur every alternate instant a current of air in the opposite direction, i.e., if exhalation be performed through the nose, a number of the germs will be expelled again. In the absence, also, of this outward passage of air, paroxysmal attacks of sneezing, which at times may be very persistent and most distressing to the sufferer, are induced by Nature's efforts to get rid of the obstructing or irritating particles.

Fourthly, I have reason, arising out of my personal experience, for recommending exhalation through the nose. As readers of my former books will have noticed, I always recommend comparatively slow exhalation. Now, if we exhale through the nose, we are bound to do it slowly. But if exhalation is performed through the mouth, it is possible to do it very quickly by a sort of "puff." And it is my experience that beginners in the art of breathing nearly always succumb to the temptation of exhaling in this seemingly easy manner, if they are ever allowed to use the mouth for this purpose.

DESCRIPTION OF THE ORDINARY COMPLETE BREATH:

The best breath is that which, in the easiest and most natural way, with the least strain of muscle or conscious effort, and in the shortest space of time, gives the largest supply of fresh air and the most complete expulsion of vitiated air. The ordinary complete breath has already been explained in the various editions of "My System" for men, ladies, and children. All the experience I have had since I wrote my first book, and all my later theoretical studies and practical examinations of thousands of living human beings, have confirmed my conviction that my "complete breath" is the most efficacious and, at the same time, the easiest form of deep breathing. And being also the quickest manner of completely inflating and emptying the lungs, it is the most useful for athletes and sportsmen. I will now describe it still more fully than I did in my earlier work:—

Stand with the body well balanced upon the whole of your feet. The hands should rest on the hips. The shoulders thus being partly relieved of the weight of the arms. Lean the head very slightly back. Open the nostrils as wide as possible. Raise the lower ribs as far as possible outwards, and that chiefly to the sides, but also somewhat to the front, together with the breastbone. At the same time stretch the whole upper part of the trunk upwards, and continue this stretching and lifting for a while after the lower ribs have been completely expanded. The air will then rush in and fill every part of the lungs. This combined lifting and widening of the thorax resembles, to some

extent, the movements of an umbrella whose cover is loose on the stick. When we open it a little, the cover will at the same time slip up towards the ferrule, which in this comparison represents our head, the stick representing our neck, the latter being thus apparently shortened. The inflation of the lungs is performed quite automatically, owing to the vacuum which is created in the interior. Hence it is quite wrong to suppose that by sniffing and sucking more air can be inhaled. On the contrary, this will probably cause a partial closing of the nostrils since the air, when sniffed in, will have a tendency to drive the wings and outer walls of the nose into contact with the middle wall. If the inhalation is accompanied by a loud noise, then you may be sure that the nostrils are not opened so widely as they ought to be.

It is a great mistake, during this inhalation, to force the elbows and shoulders backwards and to bring the upper part of the chest into a cramped and highly arched position. It is too hard a strain compared with the result it gives. The upper lobes of the lungs will be filled in an easy and gentle manner simply by the above-mentioned stretching of the trunk with lifting of shoulders and clavicles. It is absolutely wrong in this, my complete breath, to move the abdominal wall intentionally. It should be kept quite relaxed, in a natural position. It is a mistake to make a conscious effort to ensure diaphragmatic or abdominal co-operation in the complete breath. This will come quite unconsciously because the diaphragm sinks when the ribs are widened. The completeness of inhalation is sure to be frustrated, whether the abdomen be drawn in, or if it be distended, or if its muscles are braced in any position. In the first case, when the abdominal wall is forcibly drawn inwards the intestines are pressed back and upwards against the diaphragm, so that this muscular organ is prevented from sinking and, therefore, from doing its share in inhalation. The abdomen will naturally become more or less straightened and flattened, when the ribs are lifted and widened, according to the greater or smaller flexibility of the thorax in various individuals; but this must not be confused with a voluntary movement of the abdominal muscles. In the second case, if the abdominal wall is pushed outwards it will not be possible to lift and widen the lower ribs fully, and thus one of

the most important expansions of the thorax will be checked. Thirdly, if the abdominal wall is braced, in that the muscles forming the wall are "contracted," the lower ribs will at the same moment be fixed in a more or less contracted position. The abdominal wall may be braced either when fully distended or when completely drawn inwards, or in any intermediate position; the result—fixation of the lower ribs and consequent check of expansions—will always be the same. The only cases where the abdominal muscles should be moved voluntarily during breathing are, firstly, when they are braced for protective purposes, i.e. in infighting when boxing; secondly, when the special abdominal breath is intended. This partial respiration is rather important for women who have worn a corset. For men I employ it only in Exercise No. 11 of "My System." The considerable movement of the abdomen in this case affords a very beneficial massage to all the intestines.

I now hope I have made it quite clear that during inhalation, as a part of "the complete breath," no attention should be paid to abdominal movements, and that the more care should be taken in moving the whole thorax. This is an easy thing for animals and healthy children. But many adult human beings have quite forgotten how to exercise this valuable faculty, elderly gentlemen using only a small abdominal breath, elderly ladies only a short clavicular breath. It can, however, in most cases be easily learned again. By trying it constantly during a few days the person will soon find out which nerves control the intercostal muscles and serratus major. By practice, these muscles will by degrees grow stronger, and, finally, be capable of moving the ribs and thereby the diaphragm to their utmost limit. Fig. 1 gives a front view of the correct pose for inhalation.

Complete *exhalation* is performed by the precisely contrary movements; lower the chin again, let the ribs and breastbone sink inwards and downwards, and the whole upper part of the trunk downwards, and continue the contraction of the lower ribs to their utmost limit. To perform the first three of these movements is a very easy matter in that the sinking is caused simply by the weight of the parts in question and by the elasticity of the whole thorax. Of course this elasticity comes into action the very moment that the muscles which expanded

the thorax are relaxed. The further contraction or pressing inwards of the lower ribs, which should follow, is more difficult, and will in most cases require some practice before it can be performed. It is done by another set of the intercostal muscles; but many individuals have lost the control over these, and the ribs may have grown rather stiff, in which case they can only be moved with difficulty. It is a good plan for beginners to assist with the hands in the following manner: Take them away from the hips and lay the palms against the lower part of the chest, the thumbs pointing upwards. A pressure, becoming gradually more severe, should then be exerted inward against the lower ribs, thereby bringing them nearer to each other.

Abdominal action in complete exhalation will take place quite unconsciously, as it did in the corresponding part of the complete inhalation. Any special intentional movement of the abdominal wall is also incorrect here. If it is drawn inwards it will prevent the lower ribs from being fully contracted which hindrance to a complete exhalation will not be counterbalanced to any extent by the assistance given to the ascent of the diaphragm through the upward pressure of the viscera, because only the lower lobes of the lungs are emptied by this action, whereas both the lower and middle lobes will be emptied by full contraction of the ribs.

The intentional distention of the abdomen forms also a check to the complete exhalation because it fixes the ribs, and it is a quite unnecessary strain which should be omitted, because my "complete breath" should be in the nature of a relief. It is quite another matter that the relaxed abdomen will naturally and involuntarily protrude in a state of softness when the lower ribs are much contracted. Fig 2 gives a front view of the correct pose for exhalation. Note the great difference between the positions of the lower ribs, and the different distances from the nipples to the navel, in Figs 1 and 2 respectively.

CHAPTER VI.

HOW TO BREATHE DURING THE PERFORMANCE OF THE DAILY FIVE MINUTES

THE MOVEMENTS OF THE THORAX:

During the quiet deep breathing following each of the " quick " exercises, it is best to rest the hands on the hips as shown in Figs. 1 and 2. The air should be made to enter and leave the lungs, through the nose, by the expansion and contraction of the chest walls themselves, and not by moving the abdomen, nor by any sucking efforts made by the nose or mouth. The lower ribs should be expanded mostly sideways, and the whole thorax then prolonged upwards like a concertina which is drawn out. The force of the arms can be very helpful in this movement, in that the hands press upon the hip bones in a downward direction. The air will then enter the chest, owing to the vacuum created inside, if only the nose be well opened. As soon as the air is fully inhaled, the muscles which expanded the chest are relaxed, so that it collapses, compressed by its own weight, and the foul air is forced out of the lungs and through the nose. To make the expiration more complete, the lower ribs should be contracted as much as possible, whereas the abdominal wall must be kept relaxed and therefore slightly protruding.

NOISELESS NOSE-BREATHING:

There should never be the slightest pause between inspiration and expiration. The air should be constantly moving steadily either inwards or outwards. The nose should form a passive passage for both the in and outgoing air, the nostrils being well dilated during inhalation. Correct breathing is almost noiseless. Hence, it is a mistake to suck or sniff with the nose, and to whistle or blow with the mouth: any noise is only a sign of a narrow air passage. The chest should be used



FIG. 1.—Inspiration—Press well downwards upon the hip bones, thereby assisting prolongation of the thorax in that the arms are somewhat stretched.



FIG. 2.—Expiration—Here the arms are more bent at the elbows, owing to the "collapse" of the thorax.

as a pair of bellows, changing the air of the lungs as completely as possible. Breathing should be through the nose, not *with* the nose, but *with* the chest. (For further details see "My Breathing System.")

FAULTY WAYS OF BREATHING AND OF MEASURING LUNG CAPACITY.

It is wrong to imagine more air is inspired by arching the chest and throwing the shoulders back—as is done in the old-fashioned "deep-breathing." This is a muscular strain, whereby the air space is not augmented, but only shifted, a hollow being created between the shoulder blades.

It is wrong to stand quietly and take very deep breaths without any previous exertion: the deep breaths will be more complete, more easily performed and give comfort instead of giddiness, if combined with bodily exercises requiring increased change of air in the lungs.

It should never be forgotten that the best way of breathing during exercise should be the easiest and most natural, whereby the largest amount of air is changed with the least strain and in a short time. To take a full breath more slowly than necessary for the natural respiratory act, is, besides, artificial and a strain on the heart.

The vertical expansion forms the most important part of a full, but easy inspiration. The shoulders should not be lifted separately, but raised with the superior part of the thorax, which should lengthen upwards several inches. The deepest and most comfortable expiration is completed by contracting the ribs, with the abdomen relaxed.

I know very well, in these two points I am in controversy with all the text-books. But by practical demonstrations I have convinced the most prominent Professors of Physiology, for instance, Dr. LEONARD HILL, that my method is right and the best for practical purposes.

It is a most curious fact, therefore, in my opinion, that this natural method of increased respiration is not even mentioned in the most commonly used text-books on Physiology.

Perhaps, however, this explains why so many recruits and

candidates for admission to the military schools were rejected for insufficiency of chest measurement, although they had a fair lung capacity. Unfortunately for them nature has endowed them more richly with vertical than with horizontal expansion, and their measurements were always taken from a tape laid *horizontally* round the chest.

The vertical expansion being so important, it is clear, measuring the capacity of a chest by a tape laid horizontally round it, as is always done in examining recruits, cannot give a reliable result; if a person thus measured show a difference between expiration and inspiration of more than five inches, this is due, not to further augmentation of the air space, but to contraction of the muscles below the armpits. Even a small man can, by a trick, show a measurement of fifty inches chest circumference, if he first push out his back and broaden himself laterally as mentioned above, and then arch his chest and press the shoulders back, simultaneously pinching the tape in the armpits: the examiner will probably not notice the tape hangs down loosely in a large loop upon the back of the individual!

HOW TO TIME THE MOVEMENTS TO THE BREATHING:

The deep breaths simultaneous with the various movements of the ten exercises, should be performed, as far as possible, in the same manner as the quiet deep breaths described above, and which follow immediately after each of the five "quick" exercises. The movements of the body and legs in the five "slow" exercises should actually be performed rhythmically with the natural and comfortable, full respiration of the individual. When, however, the body is bent or twisted to the very limit, it will often be difficult to continue inspiration, until the point is reached when the direction of movement should be changed. Then, instead of following the natural tendency of holding the breath, expiration should begin immediately, viz.: a slight moment before the turning point is reached. This remark refers to the Second, Third and Fourth exercise. It is always a good thing to allow a little longer time for expiration than for inspiration.

There should be no stop or pause between the first five

exercises (the "slow" ones): each of them should finish with an expiration, during the last part of which the feet should eventually be shifted into the position necessary for the following exercise, which naturally starts together with the immediately subsequent inspiration.

After each of the five "quick" exercises, as mentioned above, two or three special deep breaths follow with hands resting on hips. During the last expiration the feet should be placed in the position necessary for the following exercise.

In these "quick" exercises, the movements of both the trunk and limbs are fast, after some practice becoming very rapid: the simultaneous full and steady breathing must be quite independent of the quick measure of the movements. The common mistakes which beginners are inclined to commit, are either to take short gasps, following the quick time of the exercise, or to hold the breath. At first two double movements are executed at each respiration. With practice, when independent, steady respiration can be performed quite subconsciously, more and more movements are performed in one breath, until at last eight double movements can be mastered; either four during inspiration, and the same during expiration, or three to inspiration and five to expiration. In the latter case, the speed of the movements is slackened somewhat while inhaling and again increased while exhaling.

Beginners in the art of correct breathing may profitably practise this deep-breathing when walking in the open, for instance, to or from their business. They should take three or four strides during inspiration, and four to six during expiration. After some practice the number of strides may be augmented, but there should always be one or two more strides during expiration.

In my Institute many thousands of persons have been taught how to breathe. Only a few understand how to do it correctly when they enter as pupils, a fact not so strange when it is remembered that there are at least a dozen different erroneous methods and only one natural and correct way. I have had several cases of young men who have increased their chest expansion by two inches in a fortnight. The record of the Institute is three inches in a week.

It is clear that such an improvement cannot be due to growth or development alone, but first of all to the fact that the pupils learn to work their thorax in the right manner.

This frequently has to be explained, demonstrated and attempted over and over again, before the pupil acquires the proper control over certain respiratory muscles. These are to hand, but the pupil does not understand how to get them to work, because proper nerve connection has not yet been established.

It is urged as a proof of the strictness of the British recruiting, only about half the applicants are permitted to enlist, lack of chest development being in most cases the cause of rejection. It may be all very well to praise the rigour of the recruiting doctors; but the above-mentioned fact is at all events no credit to those who were responsible for the physical training of the rejected individuals, namely, the school authorities.

CHAPTER VII

DESCRIPTION OF THE TEN EXERCISES.

FIRST EXERCISE—SLOW STRETCHED LEG MOVEMENT:

Stand with feet almost together and parallel.

First degree. Slow raising and lowering of stretched legs, right and left alternately, in three directions.

Hands on hips. Slowly raise right leg forward (see Fig. 3). Raise it high, then lower it again. All this time inhale. Next



Fig. 3.



Fig. 4.

go through exactly the same movements with the left leg, but exhale.

Now raise right leg sideways to the right (see Fig. 4) and lower it again, inhaling, and move left leg corresponding way while exhaling. If the exercise be in a very small room, turn round 90° before raising the legs sideways.

The legs should now be moved backwards, raising them as

high as can be done, without leaning forward, and lowering them, the right moving as before, during inspiration, the left during expiration (see Fig. 5). The knees and ankles should be well stretched each time a leg is lifted. Repeat the whole performance once more, and this completes the exercise, the whole being two cycles, each of six double movements, the performance lasting only six respirations.

This exercise is the same as the preliminary movement to No. 14 of "My System."

Second degree. Legs kicked out in three directions, each time lowered slowly.



Fig. 5.

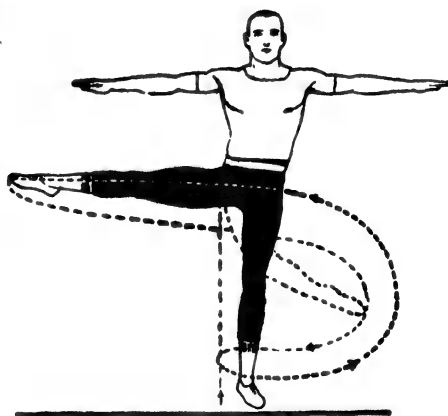


Fig. 6.

Movements, breathing and number of repetitions exactly as in First Degree, with the one exception that the legs are each time raised as high as possible with a powerful kick.

Third degree. Stretched legs moved alternately in wide arcs and in opposite directions.

Stand with the arms and fingers extended in line to maintain the balance. Move the stretched right leg forward to the left, then in the widest possible arc to the front, to the right (Fig. 6), backward, to the left behind the left leg and back to the starting position, all during inspiration. Describe a corre-

sponding arc with the left leg, exhaling. Repeat the movement but in the opposite direction, first with the right and then with the left leg. Cycle of four movements with two respirations repeated three times. Let the arms drop as each exhalation is being completed.

SECOND EXERCISE—SLOW BACKWARD AND FORWARD BENDING OF TRUNK:

Stand with feet a short stride apart.

First degree. Arms bent during backward movement and again stretched during forward and downward movement.

Bend as far backward as possible (the neck also) during inspiration, and forward and downward during expiration. The

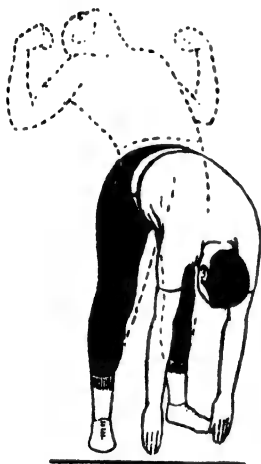


Fig. 7.

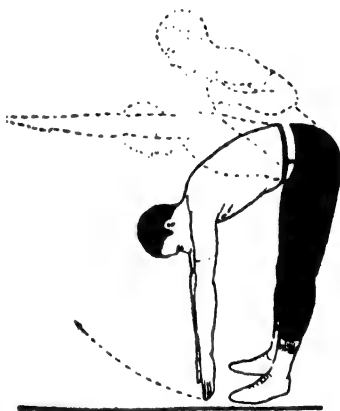


Fig. 8.

arms are bent each time during the upward and backward movement, with elbows well out, fists clenched and wrists flexed (Fig. 7). In the forward movement, the arms and hands are again stretched, the finger tips trying to reach the ground without the knees being bent. Perform six double movements during six full respirations. Be careful to start the expiration in good time, so as to avoid any holding of the breath in the extreme backward bent position. This backward bending must not be confused with the corresponding "Swedish" movement

where only the upper part of the spine is bent a little and the chest arched. My backward bending is for the benefit of the waist line muscles and the organs in the abdominal cavity. Therefore go as far back as possible, thrusting the hips forward and in this part of the exercise you may even bend the knees.

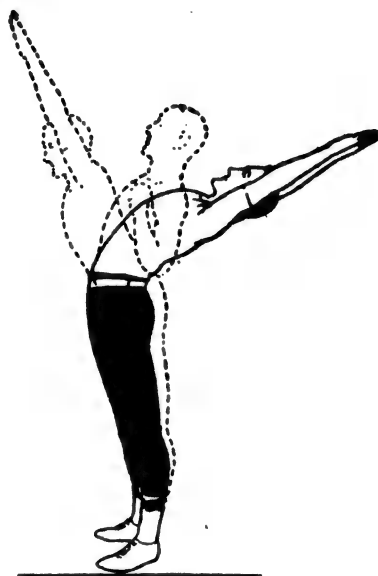


Fig. 9.

Second degree. Four beats with the arms during each double movement.

Breathing, movements of trunk, and their number, as in the First Degree. Starting position with arms stretched straight downwards as in Fig. 8, full line. Raise trunk and the stretched arms to the horizontal position, as shown in Fig. 8, dotted line (1st beat). Bend arms and stretch them again while trunk moves up and backwards into the position of Fig. 9, full line (2nd beat). Bend arms and stretch them again while trunk moves forward into position of Fig. 9, dotted line (3rd beat). Finally, bend arms and stretch them again towards the floor, while trunk moves downwards into the position of Fig. 8, full line (4th beat).

Third degree. Six beats with arms during each double movement.

Movements of trunk and their number, and breathing, similar to First and Second Degrees. But six quick arm movements are now performed during each double trunk movement: (1) from the downward stretched position the arms are raised with a jerk to a forward position (Fig. 8); (2) the arms are bent and again stretched upwards and forward (Figs. 8 and 9); (3) the arms are bent and stretched upward and backward (Fig. 9); (4) the arms are bent and stretched upward and forward (Fig. 9); (5) the arms are bent and outstretched into the same forward position as in the first beat and finally (6) the arms are bent and stretched downward to the floor (Fig. 8), thus assuming the starting position. The hands are clenched each time the arms are bent, the fingers always stretched together with the arms. Expiration must begin with the third beat.

THIRD EXERCISE—SLOW SIDEWAYS BENDING OF TRUNK:

First degree. Arms alternately half bent over the head.

Stand with heels together. Bend slowly from side to side.

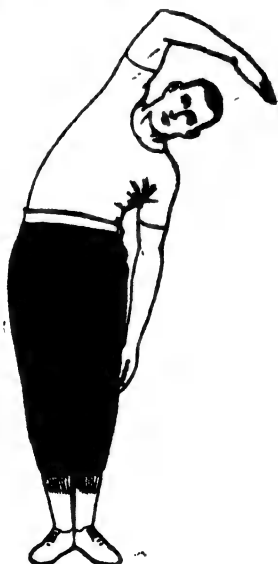


Fig. 10.



Fig. 11.

carrying the right arm, palm downwards, in a half-bent position over the head when bending to the left (Fig. 10), and *vice versa* (Fig. 11). The neck too should be bent to the sides. Inhale one way, and exhale the other, but half-way through the exercise, pause and reverse the breathing, otherwise one lung would become more developed than the other.

Perform in all six double movements during the six full respirations, or, to be quite correct, only five and a half double movements, owing to the pause. The actual movements are as follows:—

Bend to the left during inspiration, to the right during expiration, and repeat, bend to the left inhaling. Now, *stop in the same position while exhaling*. Then continue: bend to the right inhaling, to the left exhaling, and repeat twice. To lean the body forward, and to raise a heel are common faults. This exercise is the same as No. 4, second degree "B" of "My System."

Second degree. Combined with forward and backward leaning of trunk ("Trunk Circling.")

Stand with feet a short stride apart. With arms stretched upwards, fingers interlaced and wrists sharply curved, lean the trunk forward and swing it steadily round in wide circles, six times round one way, then six times in the opposite direction (Fig. 12). Inhale each time during one complete circle, and exhale during the following circle. Keep the same front the whole time, the neck stiff, the spine straight, and the abdomen well distended whilst leaning forward. The hips and seat move to counterbalance the upper part of the body which should be moved, as a dead weight, by the muscles of the waist-line. Women should have the hands behind the head.

Common faults: Trunk twisted away from the front; head moved separately; back curved whilst leaning forward; arms not fully stretched and not held in a straight line with the trunk; arms and shoulders swung round independently. This exercise is the same as No. 1, fourth degree, of "My System."

Third degree. Combined with trunk twisting.

While still in the forward bent position of the foregoing

exercise, No. 2, Third Degree, close the hands lightly, move the heels outwards, so that the feet are parallel and twist the trunk to the right, the left hand still touching the floor between the feet, whereas the right arm is stretched upwards in line with the shoulders (Fig. 13). From this position raise the trunk, still facing to the right (Fig. 14) and twist it round (from waist-line) until facing to the left (Fig. 15), all the while inhaling. Now bend half-way down to the right (Fig. 16, dotted line), then up again and as far as possible over to the left (Fig. 16, full line),



Fig. 12.



Fig. 13.

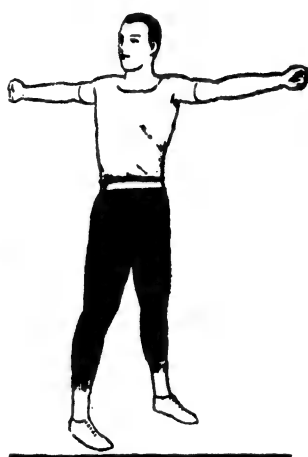


Fig. 14.

and, finally, the whole way down to the right until the right hand touches the floor (Fig. 17), all the while exhaling. Then repeat this quintuple movement, but now, of course, in the opposite direction: from Fig. 17 up into Fig. 15 and round into Fig. 14, all the while inhaling, then half way down to the left side, over to the right (or "backwards" seen from the standpoint of the lower part of the body), and finally down into the position of Fig. 13, all the while exhaling. Perform six such complete movements (each consisting of five beats) during six full respirations.

Common faults: Head moved independently; arm muscles kept in a state of tension; arms not kept in line with shoulders,

but being jerked or swung round instead of being moved steadily, together with the whole upper part of the body, by the waist-line muscles; twistings not performed above hips, but carried out in knees, or by moving feet; trunk bent down without first being completely twisted. This exercise is the same as No. 4, fourth degree of "My System."

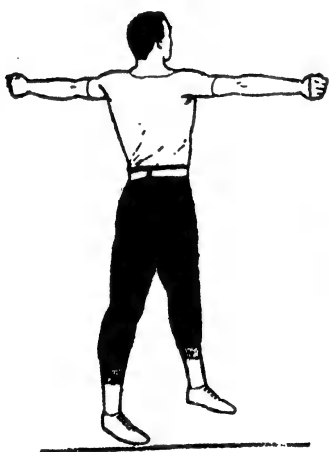


Fig. 15

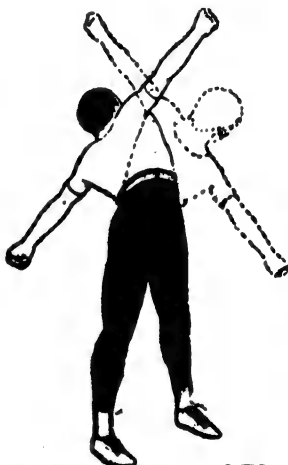


Fig. 16.



Fig. 17.

FOURTH EXERCISE—SLOW TWISTING OF TRUNK:

First degree. The upper part of the body kept in a vertical posture during the twistings.

In trying this exercise for the first time, most people would move their feet, or at least twist round from the knees, and thus miss the most important point of the whole exercise. Their energies would be wasted for they would derive no benefit from the movements at all. The twisting should be performed exclusively from the waist-line. I recommend, until the muscles of the hips, loins and lower back are stronger and more easily controlled, the beginner should sit down upon a stool or chair while performing this exercise. A stool is better than a chair, but an ordinary chair can be used if, in such a case, the

CHART SHOWING

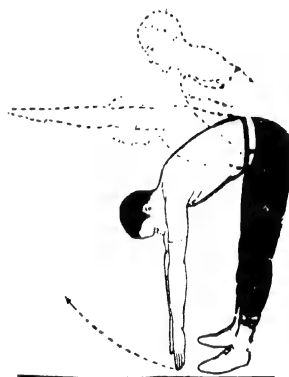
STRETCHED LEG MOVEMENT.

**BACKWARD AND FORWARD
BENDING.**

SLOW



No. 1: 2 cycles to 6 breaths

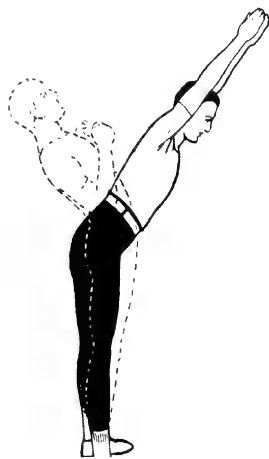


No. 2: 6 times to 6 breaths

QUICK



2 quiet deep breathings.



student will sit well forward so that, when twisting round, his arms do not collide with the back of the chair.

Put one or both legs round the front legs of the chair, thereby gripping them firmly. It is then possible to twist the upper part of the body without moving the hips or legs—the twist will be performed only from the waist upwards.

With arms hanging relaxed by the sides, twist the trunk slowly, as far as possible, first to one side and then to the other. Inhale whilst the body is turning one way; exhale when turning to the other side, also turn the head. This will also produce a



Fig. 18.



Fig. 19.

good neck exercise. After a while, to make the twist still more complete, shift the left arm over to the right side of the legs when turning to the right, and *vice versa*. Perform six (or rather five and a half) double movements during six full respirations.

As in the first degree of the previous exercise, pause and reverse the breathing, when half way through the numbers. I will explain what I mean a little more fully: Turn to the left while inhaling, to the right while exhaling, repeat, turn to the left inhaling. Now, stop in the same position while exhaling. Then continue the movements. Turn to the right inhaling, turn to the left exhaling and repeat twice.

After some weeks' practice the exercise should be able to be correctly performed in a standing position, without the help of a chair. Take up a position with the feet as wide apart as possible and turn the heels outwards. Each time the right shoulder moves backwards towards the rear, the right hip should be pressed forward (Fig. 18). When the movement is to the left and the left shoulder is brought back, the left hip should be pressed forward (Fig. 19). By taking this precaution, the all-too-easy error of turning the legs from the knees, or moving the feet when twisting the body will be in a great degree obviated.



Fig. 20.



Fig. 21.

Second degree. The upper part of the body kept leaning over one hip at a time (or, in a "sideways" inclined posture) during the twistings.

Feet a comfortable stride apart, arms extended in line. Keeping hips square to the front, turn the trunk to the left and lean "backward" over the right leg (Fig. 20). In this position the trunk is twisted three times to the utmost limit round its length-axis, and back again as much as possible in the opposite direction, head and arms following and accentuating the movements. Always inspire while the chest is turning upwards (or, to the original rear), and exhale when it is turned down (or, to

the original front). Then assume the position of Fig. 21, the trunk now leaning "back" over the left leg, and perform three double twistings in corresponding manner, during three full respirations. It should be understood that the head is each time



Fig. 22.

turned farther round than the body and the arms, partly bent, are pressed round too, so that twisting of the trunk can be as thorough as possible.



Fig. 23.
H

Third degree. The twistings performed in a long forward lunge and combined with quick arm circling.

Make a long lunge forward with the left foot, lean the body forward, the arms and fingers outstretched in line, palms upwards. From this position twist the trunk and the head as far as possible to the right (chest upwards), inhaling (Fig. 23), and then to the left (chest downwards), exhaling (Fig. 23, all the while describing quick, small circles with the hands which are moved upward to the front, and downward to the rear. Repeat this double twisting movement twice more, but stop to the front

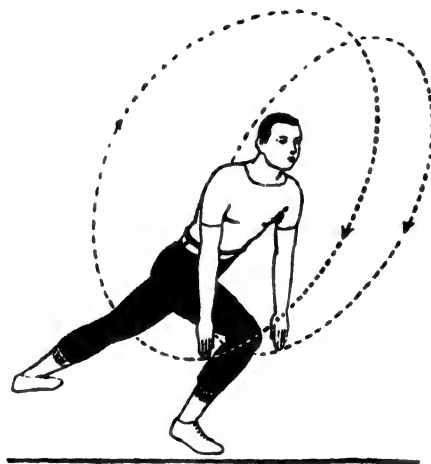


Fig. 24.

and perform some large, loose circles during the last (3rd) expiration. Then lunge forward with the right foot and perform three other double twistings in a corresponding manner, the hands now being circled downward to the front and upward to the rear.

Fig. 24 shows the large circles of this second series.

Common faults: Arms swung in front of, instead of at the sides of the body; hands moved up and down only, instead of in small circles; trunk kept erect instead of being inclined in line with the rearmost leg. This exercise is the same as No. 5, fourth degree, of "My System."

FIFTH EXERCISE—SLOW BENT LEG MOVEMENT:

First degree. Slow arm raising and squatting down.

Stand with feet comfortably apart, palms turned to the rear (Fig. 25, full line). Raise the arms, with palms downwards, slowly to the front while inhaling fully. Squat down completely (Fig. 25, dotted line) and come rather quickly up again, during expiration. The arms should be kept to the front to assist the balance in the squatting position, and then lowered again during the upward movement of the body. The feet should be flat upon the floor during the whole performance. At no time during the exercise should the heels be raised. Perform six treble movements during six full respirations.

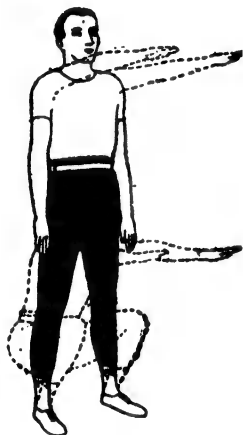


Fig. 25.

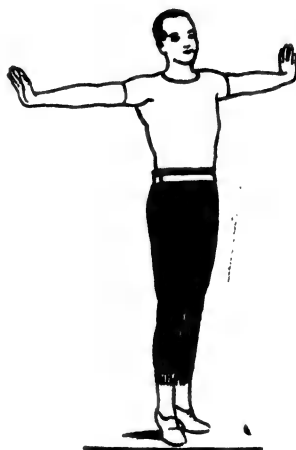


Fig. 26.

Beginners who are inclined to fall backwards or to raise the heels may content themselves with squatting down half way, or they may take hold of the bedrails: stand quietly while taking a full inspiration. Then squat down and come up again, all during expiration. You may assist yourself in the upward movement by a pull on the bedrail. This exercise is the same as the preliminary movement "B" of No. 10 of "My System."

Second degree. Continuous deep knee-bendings, heels together and constantly raised.

Stand with heels together, rise on toes, the arms and fingers

being outstretched sideways, with hands bent well backward from the wrists (Fig. 26), inhaling. Bend knees outward and try to sit on heels, the arms being lowered inside the legs, with the fists clenched and bent well inward, exhaling (Fig. 27). Stretch up again to former position, inhaling, and so on, balancing upon the toes the whole time. It is easier to keep the heels pressed constantly and firmly together, when the balls of the feet are not too wide apart. During the last (6th) expiration the knees are not bent, but the heels lowered very slowly. This exercise is the same as the first special Knee-bending Exercise of "My System" (new edition).



Fig. 27.

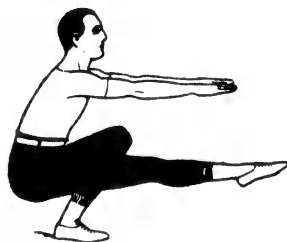


Fig. 28.

Third degree. Squatting down on only one leg at a time.

Stand with feet almost together and parallel. As in the first degree, raise the arms slowly to the front, palms downwards, during inspiration. Then sink down bending the right leg completely, the left being stretched out to the front (Fig. 28), and immediately rise again to starting position, lowering the arms, all the while exhaling. Repeat the performance, but this time bend the left leg. Perform in all six squattings, alternately with right and left leg, during six full respirations. When bending and stretching the leg, balance upon the whole sole of the foot, as shown in the figure, or on the toes only, as desirable. At

first, one hand on a solid piece of furniture can be used as a support.

In the foregoing I have described the first half, i.e., the five "slow" exercises of my short system. I will now describe five corresponding exercises, namely, a stretched leg movement, three trunk movements and a bent leg movement, only with the difference that these five later exercises are to be performed quickly, with several movements to each breath, and I recommend always to accelerate the speed during expiration and slacken down a little each time during inspiration.

The three trunk exercises will, as before, be a backward-forward movement, a sideways bending and a twisting exercise. Bear this in mind and you will find it very easy to memorise the ten exercises of the whole series.

SIXTH EXERCISE—QUICK STRETCHED LEG MOVEMENT:

Stand with feet almost together and parallel.

First degree. Quick backward raising of stretched legs alternately.

Place the hands on hips. Now raise the legs, alternately the right and the left, lifting them as high up behind the body as possible. Be careful not to lean more forward than you can help, and bend the knees as little as possible (Fig. 29). After sufficient practice the body will be kept erect and the legs perfectly straight during the exercise. The muscles of the loins and the lower back will thereby be strengthened. Point the toes each time a leg is lifted; this also makes the exercise a powerful one for the calves. This exercise may be called the



Fig. 29.



Fig. 30.

“ Door-mat ” exercise, because the legs are moved in much the same way as when wiping the feet on a door-mat.

The breathing must be maintained regularly and fully. In the beginning, raise and lower first the one and then the other leg, while inhaling once. Then repeat the movements whilst exhaling. After practice, more and more double movements will be enabled to be performed to each respiration, until at last, let us say, ten may be carried out. This means that during four full respirations, both the right and left leg will be raised and lowered twenty times.

After this, stand still and take two very full breaths without doing any leg movements at all: six respirations should be completed to form the full “quick” exercise—the same number as were, also, allotted to each “slow” exercise. The only difference is that in doing the “quick” exercise, stop and pause during the two last breaths.

Second degree.—A—Quick forward raising of stretched legs alternately.

Keep the arms and fingers outstretched horizontally to the front. Raise the legs, alternately the right and the left, lifting them as high up as possible to the front without bending the knee. Point the toes and try each time to reach the hands (Fig. 30). Breathing as in First Degree.



Fig. 31.



Fig. 32.

Second degree.—B—Quick sideways raising of stretched legs alternately.

Keep the arms and fingers outstretched sideways in line with the shoulders, or horizontally. Raise the legs, alternately the right and the left, lifting them as high up to the sides as possible without bending the knee. Point the toes and try each time to reach the fingers (Fig. 31). Breathing as before.

On one day perform method " A " and the next day method " B," or better still continue both methods each day, performing

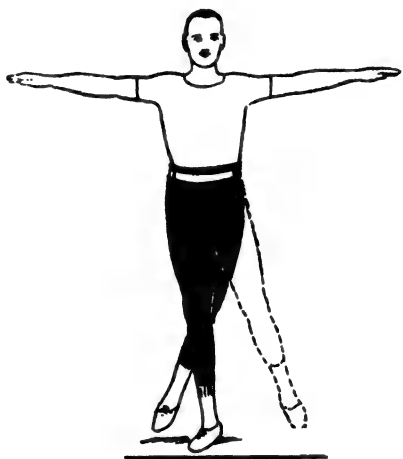


Fig. 33.



Fig. 34.

" A " during the first two respirations, and " B " during the next two, always resting and breathing deeply during the last two. One may also combine " A " and " B " with the backward raisings, which are then put in the middle, thus giving the arms a rest.

Third degree.—A—Short forward-backward swings, hands on hips, and long ones with arm swings.

Stand with hands on hips and swing the one leg uninterruptedly and very quickly to and fro, about 12 inches to the front and 12 inches to the rear, as many times as possible, while inhaling, exhaling, and once more inhaling. Then during the

following second expiration release the hip-hold and swing the legs a few times as high as possible both ways, simultaneously swinging both arms loosely, the one moving forwards while the other is swung backwards (Fig. 32). Repeat these movements with the other leg and both arms during the next two respirations, and finish by taking two deep breaths—standing quite at ease. During the short swings the leg should be kept quite stiff, as a cork leg, whereas during the long swings it should be loose and limp in all the joints and muscles. When the left leg is swung high up forward, the left arm should swing backwards, and the right arm forwards, and *vice versa*. This exercise is the same as No. 2, Second Degree, of "My System."

Third degree.—B—Short sideways swings, arms extended in shoulder line, and long ones with arm swings.

Stand with the arms and fingers outstretched sideways and swing the one leg very quickly and without the slightest pauses in short sideway swings behind the other leg (Fig. 33), while inhaling and exhaling once. Continue, during the second inhalation with similar short and smart sideways swings in front of the standing leg, and finish, during the following exhalation, with some long and loose swings, throwing the leg as high up to the sides as possible, simultaneously swinging both arms together to the opposite side of that to which the leg is thrown (Fig. 34). The performance is then, during the next two respirations, repeated in a corresponding manner with the other leg and both arms. Finish with the usual two comfortable deep breathings. This exercise is the same as No. 2, Third Degree, of "My System." Carry out "A" the one day, and "B" the next, or daily combine them, as explained under exercise No. 2, Fourth Degree, of "My System."

SEVENTH EXERCISE—BACKWARD AND FORWARD FLINGING OF TRUNK:

Stand with feet a short stride apart. Perform from two to eight double movements to each breath.

First degree. With hands on hips.

Lean the upper part of the body backward without bending

the neck, but push the hips well forward (Fig. 35). Then lean the trunk forward, keeping the back stiff and a little hollowed, the abdomen well out and push the hips backwards. The neck should be kept rigid, the head maintaining the natural erect position. Now move the trunk to and fro in the positions shown in the picture. On the first days do these movements rather steadily; but do not pause, keep the trunk in motion.

In the beginning it may be possible to perform only one double swing with the body during inhalation, and the same during exhalation. Steady practice, however, will soon give more strength and quickness. In the end it may be possible to fling the trunk thirty-two times backwards and thirty-two times forwards, during the four full respirations. Do not forget it is

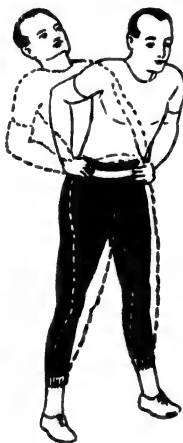


Fig. 35.

especially during the exhalations, the speed is increased.

This exercise will strengthen the abdominal muscles and tone up the inside organs to an enormous degree. It is important during the whole performance, the abdomen should be rather distended, the back and neck rigid, and the hips swinging freely. This exercise is the same as the preliminary movement to No. 18 of "My System."

Second degree.—A—With hands behind the neck.

Movements and breathing exactly as in the First Degree. But the arms now being held steadily in a lifted position, the

weight to be moved is considerably heavier and the work to be done by the waist-line muscles correspondingly stronger.

Common faults: Head moved independently, back curved, abdomen drawn inwards and breath held.

Second degree.—B—With arm and finger movements.

Both arms should be bent and the hands clenched in each backward movement, and arms and fingers stretched upwards in each forward movement (Fig. 36). Be careful to push the arms up in line with the trunk. "A" and "B" may be performed on alternate days, or combined each day, allowing two respirations to each method. But women should perform the "A" method only.



Fig. 36.

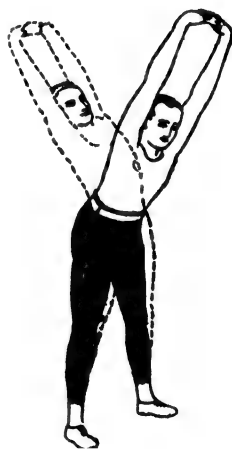


Fig. 37.

Third degree. Arms kept in upward stretched position with the fingers interlaced.

Movements of the trunk exactly as before, but the weight to be flung is now further increased, in that the arms are kept steadily outstretched close to the ears, with fingers interlaced and wrists sharply curved (Fig. 37). Be careful to move only at the hips; do not give way in the shoulders.

Extra degrees: 1. While the trunk is flung smartly backward and forward as explained in the Second and Third Degrees, it is at the same time twisted slowly to alternate sides. Inhale each time the trunk is twisted the one way, exhale when moving in the opposite direction.

2. During the smart backward and forward flingings, the trunk is bent slowly sideways, alternately to the left and right. Inhale one way, exhale the other.

EIGHTH EXERCISE—SIDEWAYS FLINGING OF TRUNK:

Perform from four to twelve "jerks" to each breath.

First degree. With arm "pumping."

Stand with heels together and hands clenched. Swing the upper part of the body from side to side. The right arm should



Fig. 38.

be stretched downwards and the left arm drawn up and bent at the elbow each time the trunk goes to the right side, and *vice versa*, when the movement is to the left (Fig. 38). The arms then form a kind of powerful pumping movement. The pace of the movements must not be too brisk at first, but care should be taken not to pause in the bent position.

The principle of the breathing is exactly as described in the Seventh Exercise, but even the strongest and quickest would scarcely be able to do more than six double movements during each respiration without shortening the movements, i.e., not bending to the utmost. Two full respirations with the body and arms quite still, complete the exercise of six full respirations. The head must not move independently of the body, or dizziness may result when the body is moved very quickly.

It is a general rule in all my "quick" body movements that the neck should be kept rigid with the head in the natural

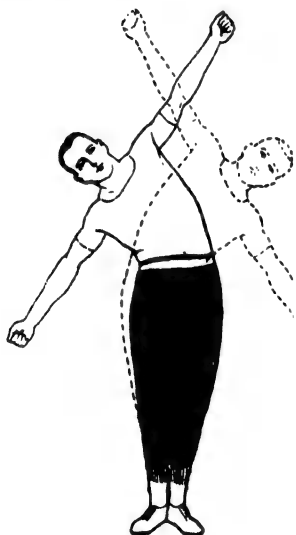


Fig. 39.

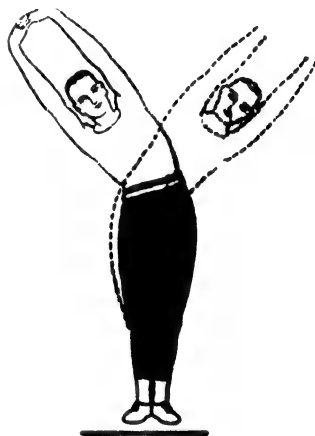


Fig. 40.

position. This is different from the rule controlling the "slow" exercises, where the head is allowed to move in order to accentuate the body movements, and opportunity is thus taken of performing a simultaneous neck exercise.

This exercise is the same as the preliminary movement to No. 16 of "My System."

Second degree. With arms extended in line.

Same position of legs and same movements of the trunk as in First Degree; but the arms, with clenched hands, should now

be kept outstretched sideways in line with the shoulders (Fig. 39). In this manner the work to be done by the muscles of the waist is much increased, unless the great mistake is made of moving the arms from the shoulder joints. Increase the speed on each expiration.

Third degree. Arms kept in upward stretched position, with fingers interlaced.

Position of legs and movement of trunk exactly as before; but the stretched arms, with wrists sharply curved, are now kept in the same position as in the third degree of the Seventh Exercise (Fig. 40). Be careful not to swing from the shoulder joints, or to let the arms drop forward.

Extra degrees: Feet apart and parallel..

1. While the trunk is flung smartly to alternate sides, as described in the Second and Third Degrees, it is at the same time slowly twisted round its vertical axis.

Inhale when the trunk is twisted one way, and exhale when moving in the opposite direction.

2. During the smart sideways flingings, the trunk is leaned slowly backward with simultaneous inhalation, then forward during exhalation. Keep the abdomen out and do not curve the back.

3. Twist the trunk and lean slowly "backward" over the one hip while inhaling, then lean slowly "forward" over the other hip, exhaling, then lean once more "backward" inhaling, and once more "forward" exhaling. Now twist slowly round in the leaned position inhaling, then lean slowly "forward" over the other hip, exhaling, then lean "backward" inhaling, and finally rise to the upright position, turn to the front and lower the arms during the fourth and last exhalation. But during all the slow leanings from one hip to the other, the trunk should at the same time be flung smartly sideways, as described in the Second or Third Degree of this exercise. As you will see, this "extra degree" is almost identical to the Fourth Degree of Exercise No. 7 of "My System."

NINTH EXERCISE—QUICK TWISTING OF TRUNK:

Stand with feet as wide apart as possible, toes turned inwards.

Perform from four to twelve "jerks" to each breath.

First degree. With hands on hips.

Turn the upper part of the body from side to side. This twisting should be performed entirely from above the waist-line, just as was the case in the slow twisting of the trunk in the Fourth Exercise.

There is one exception. In the slow exercise the head was turned with, and even more than, the trunk. In this quick



Fig. 41.

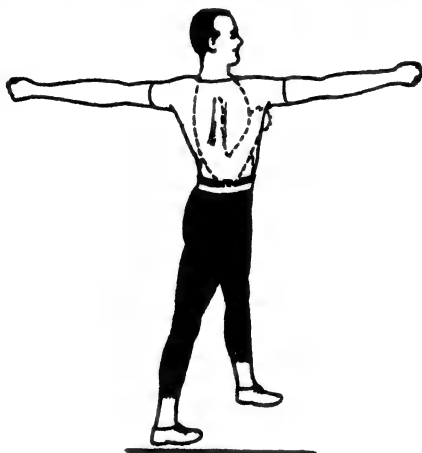


Fig. 42.

exercise it should now remain stationary, facing the front the whole time (Fig. 41).

As in the Fourth Exercise, I would strongly recommend the beginner to sit firmly upon a chair or stool, with one or both legs round the front legs of the chair. Also, if possible, place the stool in front of a large looking-glass so as to watch the movements the whole time. Sitting on the stool will prevent any movement below the waist-line; whilst looking straight at the looking-glass will make it certain the head is not turned with the movement of the trunk.

In the beginning only perform two turns during inhalation, and two during exhalation. Day after day, however, the speed should be increased so that in the end it may be possible to make forty-eight twists to left and right during the four full respirations, always moving a little quicker while exhaling. Later, when the exercise is performed standing, much care must be taken that the twisting is not done at the knees, but actually at the waist-line. As in the Fourth Exercise, the hip should be pressed forward each time the corresponding shoulder is swung backwards.

Finish the exercise by taking two deep respirations while standing quite still. This exercise is the same as the preliminary movement to Exercise No. 17 of "My System."

Second degree. With arm "punching."

The trunk movements exactly as in the First Degree. But the arms should, with hands clenched, be bent each time half the twist is performed (i.e., facing the front) and pushed strongly outwards in line with the shoulders each time the trunk is twisted completely round to any side (Fig. 42). Be careful not to punch downwards with the rear arm.

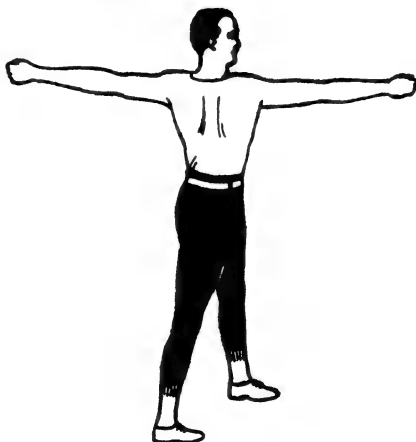


Fig. 43.

Third degree. With arms extended in line.

The trunk is twisted quickly as before, but the arms, with clenched hands, should now be kept outstretched sideways in

line with the shoulders (Fig. 43). When performed correctly it is a stronger exercise than the foregoing: the arms should be moved as a dead weight with the trunk, by the force of the waist muscles.

But if the mistake is made of using the arms for swinging the trunk round, then it is an easier exercise, the point in the performance and the full benefit being missed.

Extra degrees: 1. While the trunk is twisted smartly to alternate sides, as described in the Second and Third Degrees, it is at the same time bent slowly backward and forward. Inhale each time the trunk moves up and backward, exhale each time it moves forward and down.

2. The quick trunk-twistings are here combined with slow sideways leanings alternately over right and left hips. The head should now follow the movements of the trunk, i.e., not face constantly to the front. Each time on leaning completely over one of the hips, for a moment the body will be in a position exactly as in Exercise No. 7, Third Degree, of "My System."

TENTH EXERCISE—QUICK BENT LEG MOVEMENT:

First degree.—A—Quick raising of knees alternately.

Stand with feet parallel and slightly apart. Let the arms hang down by the side. Raise the knees, right and left alter-



Fig. 44.



Fig. 45.



Fig. 46.

nately, as high up towards the chest as possible. Do not allow the body to lean forward. The toes should be pointed downwards, with instep stretched each time a leg is lifted (Fig. 44). This is best done by seeing that the toes are the last part of the foot to leave the ground when the leg is lifted.

It may, at first, be possible to perform only one raising and lowering of a knee during inhalation, and one of the other leg, in the same manner, during exhalation. By practice, however, gradually the speed of the movements and the fulness of the breaths will be increased. In the end forty knee-raising (twenty with each leg alternately) during the four full respirations should be able to be performed. It would then be best to do four knee-raising during each inhalation, and six to each exhalation.

To complete the exercise, finish up (as usual) by taking two deep breathings without any movements.

First degree.—B—Quick backward raising of lower legs alternately.

Position, breathing and number of repetitions exactly as in "A." While the thighs are kept unmoved in their vertical position, the feet are thrown up backwards, the right and left in quick succession. Each time try to beat the seat with the heel (Fig. 45), the instep being stretched.

Either perform the two methods "A" and "B" on alternate days, or allow daily two respirations to each exercise.

Second degree. A number of very smart kicks performed in succession with one leg at a time, first forwards and then backwards.

Stand with feet parallel and almost together, hands on hips. Perform from four to eight very rapid and powerful kicks with one leg while inhaling, and then from five to ten of the same kicks with the other leg, while exhaling. This kick is very similar to an ordinary football kick with the toes (Fig. 46). Then perform corresponding kicks backward with left and right leg. Repeat this "cycle" once, performing in all from thirty-six to seventy-two kicks.

Third degree.—A—Quick complete squatting.

Stand with feet comfortably apart, and while keeping the feet flat upon the floor, perform the same squatting movements as in the Fifth Exercise, First Degree. But now there should be no pauses in the upright posture, the arms being raised during the downward movement of the body (Fig. 47). At first only one down-and-up movement during an inhalation may be possible, and the same during an exhalation. But after practice gradually quickness will increase, so that finally two double movements to each inhalation may be performed, and three to each exhalation, or in all twenty squattings to the four respirations.

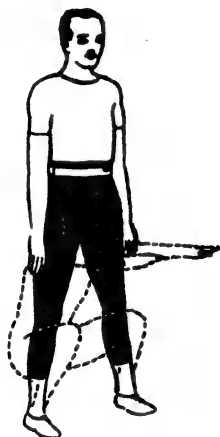


Fig. 47.



Fig. 48.

Third degree.—B—Quick deep knee-bendings, heels together and constantly raised.

Position of feet and movements of legs as in Second Degree of Fifth Exercise, only by-and-by much quicker, until at last twenty knee-bendings can be performed in four breaths, followed by the usual quiet deep breathings. The arms are now not raised and lowered with each leg movement, but are kept by the sides, outside the legs (Fig. 48) or a little to the front, to assist in keeping the balance. This exercise is the same as the second special knee-bending Exercise of "My System."



Fig. 49.

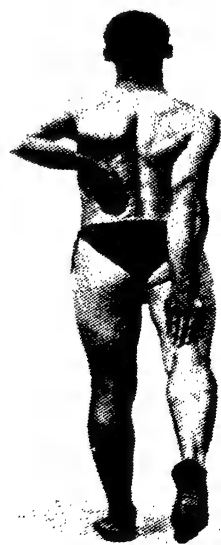


Fig. 50.

Extra degree. Perform the so-called "Russian Dance" during four full respirations, making as many "jumps" as possible to each breath. Start from the position of Fig. 48, but with hands on hips or arms outstretched to the front (which is the easier way). Stretch the one leg, beating the floor with the heel, then bend the leg again and stretch the other, and so on, alternately. Always shift your weight into the bent leg. At first you will have to stretch the legs rather to the sides. But after practice they can be stretched almost straight to the front, in a manner similar to Fig. 28, except, of course, that the left heel should rest upon the floor and the right heel be raised.

HOW TO DO THE "SHORT SYSTEM" AS SELF-MASSAGE
OR RUBBING EXERCISES.

Hardened persons, well advanced in my exercises, and who would prefer to be stripped during the performance, could, in addition, obtain the benefit of my systematic skin massage by arranging the exercises in the following way:

First Exercise. Slow stretched Leg Movement:

Rubbing Exercise No. 14 of "My System."

Second Exercise. Slow Backward and Forward Bending of Trunk:

Rubbing Exercise No. 11 of "My System."

Third Exercise. Slow Sideways Bending of Trunk:

Rubbing Exercise No. 12 of "My System."

Fourth Exercise. Slow Twisting of Trunk:

Position and movements similar to the ordinary First Degree of this exercise, but each time you have twisted the upper part of the body to the right, the left palm should rub several times up and down the right flank, the back of the right hand simultaneously rubbing up and down the left flank (see Fig. 49). When you have turned round to the left, you should perform corresponding rubbings (but replace the word "right" with "left," and *vice versa*, in the above description). Inhale each time you turn slowly from one side to the other, exhale each time you pause in the twisted positions and rub the flanks.

Instead of this exercise, you might perform Rubbing Exercise No. 13 of "My System."

Fifth Exercise. Slow Bent Leg Movement:

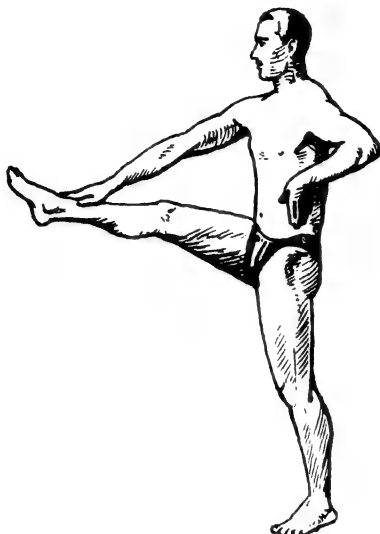
Similar to rubbing Exercise No. 10 of "My System," but after the preliminary slow arm raising with inhalation

CHART SHOWING

STRETCHED LEG MOVEMENT.

BACKWARD AND FORWARD BENDING.

SLOW

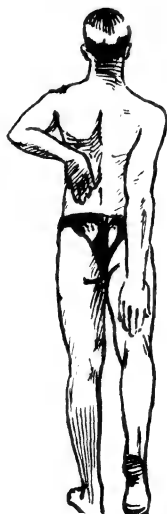


No. 1: 2 cycles to 6 breaths.



No. 2: 6 times to 6 breaths.

QUICK



2 quiet deep breathings.



a complete movement of 5 beats, with squatting, is performed during each exhalation, and the same during each following inhalation.

Sixth Exercise. Quick stretched Leg Movement:

Position, leg movements and breathing exactly as in the ordinary First Degree of this exercise, but instead of having "hips firm," place the palms against the loins and rub down the seat and back of thigh each time a leg is lifted, and upwards again to the starting point each time the leg is lowered. The left palm strokes the left thigh, the right palm in turn the right thigh (Fig. 50).

Instead of this exercise you might perform the foot rubbing of Exercise No. 9 of "My System." The leg of the rubbing foot held as stiff as possible at least when the side of the other foot is being rubbed. The arms should be kept sideways balancing the body.

Seventh Exercise. Backward and Forward Flinging of Trunk:

Rubbing Exercise No. 18 of "My System."

Eighth Exercise. Sideways Flinging of Trunk:

Rubbing Exercise No. 16 of "My System."

Ninth Exercise. Quick Twisting of Trunk:

Rubbing Exercise No. 17 of "My System."

Tenth Exercise. Quick Bent Leg Movement:

Similar to Rubbing Exercise No. 15 of "My System." But the knee raisings should be in quick succession without pauses, only the legs being rubbed, not the front and back of the trunk. Perform, say, two knee raisings to each inhalation, three to each exhalation.

It stands to reason, when performed as Five Minutes' System each of the five slow Rubbing Exercises should be repeated six times during six full respirations, and each of the five quick ones repeated as many times as possible during four full respirations always followed by two quiet deep breaths.

J. P. MULLER'S BOOKS IN OTHER LANGUAGES

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*** The Danish Edition of "The Daily Five Minutes," by Woels Forlag, Hauser-plads 7, Copenhagen, K.

All questions about editions in other countries not mentioned in the above list to be directed to J. P. Muller, Southbourne, Overcliff Drive, Bournemouth, England.

MY SYSTEM.

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MY SYSTEM FOR LADIES

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THE EIGHT MUSCULAR EXERCISES

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THE RUBBING EXERCISES

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MY SYSTEM FOR CHILDREN

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